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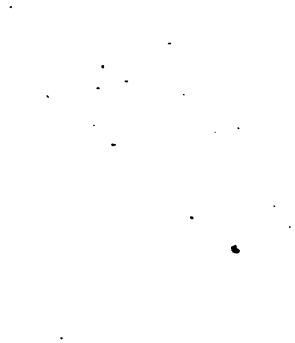

CARDINAL WOLSEY'S ELM AT MILTON PARK.

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JOURNAL

OF THE

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1881

# JOURNAL

OF

THE NORTHAMPTONSHIRE

# NATURAL HISTORY SOCIETY

AND

# FIELD CLUB.

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VOLUME II.

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*EDITORIAL COMMITTEE:*

REV. S. J. W. SANDERS. MR. R. G. SCRIVEN.
MR. B. THOMPSON.

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1882-83.

## PREFACE.

WE have great pleasure in placing in the hands of our Members our second volume, and to repeat to them at the same time that the work of our Society is still progressing. Friends, so far from being exhausted, are bringing fresh ones, and our prospects of material are even brighter than when we started. We have not even yet touched the reserve store we had when we began. We congratulate the Members on the good work which is being done, and express our hope that more still may be induced to take it up and make our Journal of still more lasting value that it is now.

To our President, Lord Lilford, to Mr. Druce, F.L.S., to Messrs. Tomalin and Hull, to Mr. F. Law, to Mr. B. Thompson, F.G.S., to Mr. W. Crick for the Index, to Mr. S. J. Newman our indefatigable Hon. Sec., and others who will, we feel sure, not resent the omission of their names in full, our thanks are due and are gladly rendered.

The Photographic section will, in the next volume, take as a subject for their pictures "Picturesque Northamptonshire." We shall be glad to receive any suggestions. The other series of papers will be continued.

THE EDITORS.

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THE WILLOW TREE AT FAWSLEY

Printed by the Oxford University Press Printing Company from

# TREES OF NORTH WALES, IV.

## The Weeping Willow (*Salix Babylonica*, Linn.).

[illegible] Europe [illegible] with [illegible] the Euphrates, [illegible] Palestine [illegible] Persia [illegible] Babylon [illegible] Babylonian [illegible] Babylonian [illegible] Babylonian

# TREES OF NORTHAMPTONSHIRE. IX.

## The Willow Tree at Fawsley.

The willow tree at Fawsley stands at the bottom of a narrow valley with precipitous banks covered with evergreens, and called the Dingle, in the pleasure grounds attached to the Hall at Fawsley. The most remarkable feature of the tree is its extraordinary height, as it has been drawn up to emulate, if possible, the stature of the surrounding trees, which are placed above it on the sides of the valley. It measures nine feet two inches in circumference at five feet from the ground, and its extreme height is 102 feet, a measurement considerably greater than that of any tree we have yet described. As the tree was not in leaf at the time of my visit I was unable to ascertain to which species of willow it belongs, but hope to do so in the course of next summer. The tree shows little signs of decay, though it has evidently reached its prime. I have suggested to Mr. Farr, the head gardener at Fawsley, that it might be worth while to propagate by cuttings, a few descendants of a tree so remarkable.

Fawsley presents many attractions to the lover of timber. On some higher ground nearer the house are some remarkably fine larch trees, standing in what is called the Larch Walk, which are well worthy of notice. The park, which is a beautifully undulating piece of ground is full of fine trees, principally oak, which though not reaching the size of the oaks described in previous numbers of the Journal, are yet, many of them, remarkable for size and beauty. Some dozen or more of the finest oaks standing near the old manor house, of which the one nearest the road is perhaps the largest: it measures at five feet from the ground sixteen feet six inches in circumference.

The photograph was taken in May, 1880.

---

It is only due to the Photographer to say that the position of the tree is a very awkward one, so far as photography is concerned, and could scarcely under any circumstances yield a very satisfactory result.

R. G. S.

# NOTES ON THE BIRDS OF NORTHAMPTONSHIRE,

By Lord Lilford, F.L.S.

53. Tree Creeper. *Certhia familiaris.*

This is a very common bird with us at all seasons. I find that Morton mentions it as "not unfrequent" at various places in our County: and adds, "At Desborough 'tis said to build in walls and to feed on cherries in cherry-time, and so 'tis called the Cherry-bird by some," but continues, with discrimination, "This I look upon as a mistake: its proper food being insects." The Tree-creeper, although as I have said, abundant with us, is, from its creeping habits and small size, more often to be heard than seen; the song is loud for the size of the bird, and the call-note, though low, is quite unmistakable. These little birds are always on the move, and, beginning their examination near the foot of a tall tree, will climb rapidly, by a series of jerky springs, round and round it, till they reach the upper branches. when they fly off to another tree and recommence the same operations. With a good glass the constant action of the beak in probing the crevices of the bark, and extracting and devouring the insects therein discovered, may easily be observed, though the rapidity and seeming hurry with which the search for food is carried on is marvellous. I have often seen a Tree-Creeper enter the holes pierced by Woodpeckers in our old elm trees; but I do not know that this species ever makes use of such retreats for nesting-purposes, though the sites chosen for that purpose are sometimes very peculiar. I think that the favourite situation is between a semi-detached piece of elm-bark and the trunk of the tree; but crevices in old wood-work, rough thatch, stacks of faggots, and many other sites might be mentioned; and we once found a nest of this bird in a bunch of dried herbs hanging from a beam in an outhouse. One of the most singular situations in which I ever met with a Tree-Creeper's nest was in the foundation of a nest of the Black Vulture in a tall pine-tree in Central Spain; and I feel certain that with us old, and sometimes new, Rooks' nests are used by these little birds. The nests vary much in the materials of which they are composed; twigs, moss, grasses, with a lining of feathers, are generally used; but I have known of a nest placed in a cloven willow tree, and built entirely of strong sedge, with a lining of wool, a few feathers, and thistle-down. I should put the full complement of eggs at about eight; I never found more, though I have heard and read of nine; they are white, generally

thickly spotted at the larger end with dark reddish brown. The young are very easy to rear in confinement up to a certain age, and are most amusing birds; but after some four or five months they begin to droop, and the only attempt to cure I have ever made was the opening of their prison door.

54. NUTHATCH. *Sitta cæsia.*

This bird is common and generally distributed in all suitable localities in Northamptonshire with which I am acquainted, though its numbers appear to me to vary greatly in different years; and I cannot help thinking that a certain amount of partial and irregular migration occurs with the Nuthatch, as with many other British birds, which cannot be strictly classed as migratory species. This is a very lively and amusing bird, combining many of the characteristic habits of the Woodpeckers, the Titmice, and the Tree-Creepers. It is continually in action, creeping up and down the rough bark of our large trees in search of insect-food, or hammering with intense energy at a nut or hard seed which it has previously fixed in some suitable crevice. At Lilford, in the winter months, these birds bring great quantities of beech-mast to a certain interstice in the masonry of the porch over the front door, and are to be seen at work there almost every day from daylight till about midday. The ordinary call-note of the Nuthatch is a loud double, "twit, twit;" but at pairing-time the male has a sort of long whistle, which often breaks into a hurried twitter, and is very distinct from the note of any other of our common birds. This is a very pugnacious little bird, and I have often been much amused at watching the attacks and pursuits carried on between it and various species of the Titmouse family and the Lesser Spotted Woodpeckers, to say nothing of frequent civil or domestic squabbles between individual Nuthatches. The food of this species is very varied, consisting in summer chiefly of insects, and in autumn and winter of nuts of all sorts, fir-seeds, hips and haws, &c., and, when they can find them, bread-crumbs and all sorts of kitchen refuse. The nest of the Nuthatch is generally situated in the hole of a hollow tree; but many exceptions to this rule are mentioned by various authors, as, for instance, a hole in a wall; and in one instance, described by Mr. Bond in the 'Zoologist' and quoted by Yarrell, "in the side of a haystack, where the mass of clay," accumulated by the birds, "weighed no less than eleven pounds, and measured thirteen inches by eight." In the usual case of a hole in a tree, if the Nuthatches find a nesting-place suited to their tastes, but with an opening larger than necessary, as is often the case, they set to work to plaster up the hole to the requisite size with wet clay, which soon becomes hard, and has often to be removed with a chisel before the nest can be got at. I have never met with more nest than a few scales of the bark of the Scotch fir,

but leaves are sometimes used. The eggs are generally six or seven, of a rather creamy white, prettily blotched or splashed with reddish brown.

The Nuthatch is an easy bird to keep in captivity, and becomes very tame if often noticed and fed from the hand. The kernel of a hazel or ground-nut is an irresistible morsel, and will tempt an old wild-caught Nuthatch to snatch it from the fingers very soon after capture. On one occasion I noticed two of these birds coming and going constantly to and from a certain spot in the stone balustrade which surrounds our flower-garden. As it was not in the nut-season, and the Nuthatches only remained at the spot for a few seconds on each visit, I was anxious to find out in what the attraction consisted, and, on examination, discovered that they were picking out large pieces of old dry mortar or cement from between the stones, I presume for the purpose to which I have already alluded, though how they managed to moisten the material sufficiently to make it serviceable in that case I cannot imagine, as the course they both took on leaving their quarry was away from any water that I knew of, though it is not improbable that they were acquainted with some deposit on or in a large branch of a tree which would suit them. This took place in the early part of July, a somewhat late period of the year for these little birds to be employed in plaster-work, as I am not aware that the Nuthatch rears more than one brood.

55. GREAT TITMOUSE. *Parus major.*

This is another very common bird in Northamptonshire, where it is often called "Blackcap" or "Saw-bird," the latter name of course being derived from its well-known notes, some of which bear a certain resemblance to the noise made in sharpening a saw. In common with all the members of this family the Great Titmouse is a restless noisy bird, always on the quest for food, very pugnacious, and in captivity even ferocious, often attacking any feathered companion in confinement, and in some instances of victory having been known to pick out and devour the brains of the vanquished. The nest of this bird is generally placed in a hole of a tree or wall, and is composed of a mass of moss with a lining of hair; the eggs are white, thinly spotted with light rust-colour, and average from six to eight or nine in number. I think that this bird frequently rears a second brood, as it certainly commences nesting-operations early in April, and I have noticed young birds just able to fly more than once in the months of July and August. The Great Titmouse is common in almost all parts of Europe with which I have any acquaintance, less so in the neighbourhood of Algiers, where I found it but seldom, always in pairs, frequenting the patches of stone-pine wood in the gardens of the suburbs.

56. BLUE TITMOUSE. *Parus cæruleus.*

The Blue Titmouse, or, as it is most commonly called by our country people, the "Bluecap," is more abundant with us than the species last described, and is one of the most amusing and attractive of our smaller British birds. Under the head of "Blue Titmouse," in Yarrell's 'British Birds,' 4th edition, will be found a far more eloquent and logical defence of this beautiful little bird against the persecution which it suffers at the hands of gardeners and others than it is in my power to write. I can only say that I am fully persuaded of the truth of the main fact therein maintained, viz. that this species is of infinitely more service than harm to the growers of fruit and flowers. I believe that the Bluecap is almost entirely insectivorous, and have often observed that in captivity it entirely rejects hemp-seed, which the Great Titmouse seems to relish greatly. This species is exceedingly fond of scraps of meat, and we used often to observe it in considerable numbers, in the winter months, busily engaged on the horse-flesh hung up near the gamekeeper's house for kennel use. When engaged in its search for food it is by no means shy, and may be closely observed; and a family of Bluecaps swinging to and fro on the waving twigs of some budding tree is, in its way, to my mind, one of the prettiest sights to be met with in our woods and gardens. The notes of this little beauty at their best hardly amount to a song, the best known being probably an harsh alarm-note, which soon brings all the birds of the species and others within hearing to inquire into the cause of disturbance. We have often, when watching for Wood-Pigeons in the plantations at evening time, been discovered by these little Titmice, who immediately gave the alarm, and soon collect numbers of their relations and congeners, besides Blackbirds, Redbreasts, Chaffinches, and other birds, all of which seem to consider that our attempts at concealment portended evil, as none of them would take much notice if we simply walked or loitered in the rides or shooting-paths of the coverts. The Blue Titmouse makes her nest of moss, with a lining of hair and feathers; it is generally placed in a hole in a wall or tree, most frequently, I think, in the former. The present birds are very bold in defence of their eggs or young, and will peck and bite fiercely at fingers inquisitively introduced into their nests. The nests are generally from six to ten in number; I have heard of as many as fifteen; they are white, thinly speckled with light rusty red. This species appears to be common in most parts of Europe; but in North Africa it is replaced by a very similar, but still more beautiful species, *Parus teneriffæ or ultramarinus.*

57. COAL TITMOUSE. *Parus ater.*

This bird, though common enough in our district, is decidedly less so than either of the two species last mentioned, to which, in general habits, it bears a great resemblance. I find that Yarrell says that it is more vegetarian in its diet than either the Great or Blue Titmouse; and I have often remarked its peculiar partiality for fir-seeds, and consequently for fir-woods, which are comparatively scarce in our part of the county. The note of the Coal-Tit differs considerably from that of the other British species of the family, and has no merit as a musical performance. The nests of this bird which I have examined *in situ* have been, without exception, placed actually under ground in the burrows of rabbits, moles, or mice; but it will sometimes make use of a low decayed tree-stump for a breeding-site; and I have heard of an instance in which a pair of Coal-Tits began a nest in one of a heap of draining-tiles which had been left for some time undisturbed. The nests which I have found were composed of moss, wool, feathers, and hair; in one instance the latter material seemed to have been entirely taken from the bellies of the Fallow-deer, and I have several times seen a quantity of rabbits' fur used as a lining. The eggs are generally six or seven, and very closely resemble those of the Blue Titmouse.

58. MARSH-TITMOUSE. *Parus palustris.*

This species, though it cannot be called rare, is certainly the least frequent of the five common British species of Titmouse in our neighbourhood, though we can generally find a pair or two of Marsh-Tits within a quarter of an hour's stroll from the house at Lilford, the old alders by the river-side being an almost sure find for these little birds at all seasons of the year. As far as my observation goes, the Marsh-Tit is not such a frequenter of gardens or the vicinity of human habitations as the three preceding species, and is less often to be found amongst high trees than those birds, though, in other respects it closely resembles them. The note is harsh and peculiar, and has often guided us towards the nest, which is generally built low in a rotten stump or an old pollard willow. Both nest and eggs may easily be mistaken for those of the more common Coal-Tit; but the present species sometimes make use of willow-down as a lining, and, as far as I know, never employs feathers for that purpose. The eggs are from five to seven to eight in number. The Marsh-Titmouse is by no means abundant in any part of the continent of Europe which I have visited, and in Spain was found by us in the province of Santander only.

59. LONG-TAILED TITMOUSE. *Acredula caudata.*

This Titmouse, though not more abundant in Northamptonshire than in many other parts of England, is, I think, one of the best known of our small birds; and the nest of the "Pudding-bag," "Pudding-Poke," or "Bottle-Tit," by all three of which names it is commonly known to our country-people, is often to be seen hung up as an ornament in our cottages. Few days occur, after the fall of the leaf, upon which I cannot make sure of finding this and the four species last descriped without much search; and, in the autumn and winter, where one of this species is found it is pretty certain that more are not far off, as the "Bottle-Tit," generally travels in family parties, which follow their leader from tree to tree with an undulating flight and constant twittering note, and on alighting immediately begin a close investigation of the smaller branches and twigs for insects, which, I believe, form the only food of this species. On a warm sunny day in early spring the old whitethorn bushes near the house at Lilford are sometimes alive with our five species of Titmouse, besides Golden-crested Wrens, Tree-Creepers, Nuthatches, and other birds, and with a little caution all these may be closely observed. I am not aware that the Long-tailed Titmouse possesses any song or notes other than those above mentioned; in fact, none of the birds of this family are remarkable for their musical powers, though many of them are noisy enough. This little bird has the same habit as the Golden-crested Wren of huddling together in clusters, composed of many individuals, under the branches of some thick evergreen tree in severe weather. I have met with and heard of many such instances in our neighbourhood. On one occasion I saw one of these birds enter a Woodpecker's hole; but, on examination, found that there was no appearance of any nest therein, and can only suppose that the visit was prompted by curiosity. The wonderful nest of this species is so well known, and has been so often described, that I shall not enter into any particulars concerning it, except to say that, although it is generally placed in the middle of a thick thorn-bush in our old fences, we once found one swinging with every gust of wind in the leafy extremity of a straggling elder-bush overhanging a path in one of the plantations at Lilford. The greatest number of eggs we have ever met with was eleven, but the average number is about seven; their usual colour is white, with faint markings of pale rusty red, but many instances have come under our notice in which they were pure white. These birds frequently use their nest as roosting-places in autumn and winter.

60. BEARDED TITMOUSE. *Panurus biarmicus.*

I am not aware that any instance of the occurrence of this bird in our county has hitherto been recorded, though it was in former years pretty

common amongst the vast reed-beds which fringed Whittlesea Mere in the closely adjoining county of Huntingdon. I should hardly, however, consider myself justified in admitting it into this list solely on that ground, but to do so from the fact that on one occasion we heard its unmistakable call in a small patch of reeds on the left bank of the Nen at a short distance below Lilford. This happened in the month of September certainly; of the year I do not feel quite sure, but it must have been either 1848 or 1849. I had never previously heard the note, and was entirely puzzled; I was alone in a boat, and though I attempted, after waiting a considerable time, to get a sight of the unknown bird by forcing it to take flight, I could not succeed in so doing, and it was only after an interval of some years that I again heard the same notes amongst the Broads of East Norfolk, and found that they proceeded from a party of "Reed-Pheasants," as this bird is called in that district. There could be no mistake about it; my unknown bird was undoubtedly a Bearded Titmouse; nor was there any thing extraordinary in the fact of his presence in the spot mentioned, as the species is given to autumnal wanderings, and Whittlesea Mere is within a very moderate distance as a bird flies, with many opportunities for rest by the way. I can say but very little of the habits of these birds in a wild state, having only met with a few now and then in East Norfolk when we were in pursuit of wild fowl during the winter months. They appeared to keep in small parties, and gave forth a constant ringing bell-like call, very peculiar and very musical: they were not very shy; and on one occasion, whilst lying hidden in a reed-bed for a shot at some wild fowl, I had eight or nine of these graceful little birds close around me for several minutes; they climbed rapidly up the reeds, examined the heads of the plants, and constantly darted down to the ground, or rather crust, from which the said reeds were growing, to recommence operations on other stems. Their actions much resemble those of the true Titmice, from which in many other respects, such as internal structure, nesting-habits, coloration of eggs, and voice, they differ very widely. I have never seen a nest of this species *in situ*, but received a beautiful specimen thereof some years ago from Holland: this nest is built almost entirely of the leaves of the common reed, with a few blades of fine sedge, and lined with the soft tops of the former plant; the eggs in this instance were six, of a pure white, speckled and irregularly streaked with dark brown.

The Bearded Titmouse is still to be found in some numbers in certain spots in East Anglia, though many of its former haunts are no longer suitable to its habits, from the effects of draining and cultivation. The chief food of this species appears to be the seed of the reed; but in captivity I have found them almost omnivorous, and ants' eggs were very favourite

morsels with them, as they are with almost every cage-bird with which I have any acquaintance. My living specimens of this species were purchased in London, and were said to have been sent thither from the Netherlands; they became very tame, and are very engaging pets, in motion the whole day long, often hanging head downwards from the top of their cage, and crowding together closely at dusk on the same perch. I found this species in Albania, but have not met with it elsewhere out of England, though it is not uncommon in several parts of Europe, and is well known in one or two localities in the east of Spain. From the nature of its usual haunts, the Bearded Titmouse during the summer months is much more often to be heard than seen, and its note once heard can never be mistaken for that of any other European bird.

61. WAXWING. *Ampelis garrulus.*

Of this beautiful bird in its wild state I know nothing from personal observation, and therefore cannot do better than recommend thsse who may be interested in its habits to read the article headed "Waxwing" in the fourth edition of Yarrell's 'British Birds.' A winter seldom passes without a record of the occurrence of this species in some part of England, most frequently in the eastern counties; and on several occasions it has visited our islands in very large numbers: in the winter of 1849–50, for instance, "it appears that 586 examples were recorded in the 'Zoologist' as occurring between November and March, nearly half of them in the second and third weeks of January." Perhaps the most remarkable fact with regard to the Waxwing is that, although the bird had been known in this country and in most parts of Northern and Central Europe for at least two centuries, it was only as an uncertain winter visitor, and till the year 1856 its manner of nesting, colour of eggs, &c. were matters of profound mystery. In that year, however, the secret was discovered through the indefatigable exertions of the late Mr. John Wolley, in Lapland, a condensed account of whose most interesting discovery will be found in Yarrell *(loc. sup. cit.)*, and full details are given in 'The Ibis' for 1861 (pp. 92–106).

The Waxwing has occurred several times to my knowledge in our county and on its borders. Three were obtained near Thurning in or about 1838; one of these birds was preserved, and was for a long time in the possession of a relation of mine, to whom it was brought "in the flesh." In the winter afore-mentiondd of 1849–50 several of these birds were shot in the neighbourhood of Peterborough, one of which (a very fine old male) is now in my own collection. Mr. A. G. Elliott, of Stamford, has informed me that several were killed in Stamford open field in 1844–45; and the Rev. R. S.

Baker, of Hargrave, in a letter dated February 15, 1876, writes that "the Waxwing has been shot in this village some years back." Besides these instances I may mention that on December 3rd, 1875, we heard the chatter of a party of Waxwings passing overhead whilst we were inspecting my aviary in the pleasure-grounds at Lilford; the air was full of snow, and we could not see the birds, though they seemed to be at no great distance. I must add that I am well acquainted with the note of the Waxwing from having kept many of them in confinement, a proceeding which I cannot recommend, as they have no merit whatever except their beauty, being dull, quarrelsome, greedy, and filthy to an incredible degree, and in most instances dying from plethora after a short captivity. Hips and haws, currants, raisins (in fact, small fruits of all kinds) are voraciously devoured by these birds, and appear to be their favourite food; but they will also eat chopped meat, hard-boiled egg, hemp-seed, bread-crumbs, carrots, potatoes, and ants' eggs; they drink a great deal, but seldom wash; and I have more than once seen a Waxwing deliberately eat its own fæces, though it was abundantly supplied with many varieties of food: none of these birds ever became tame with me, and I shall certainly never buy any of them again. I have no doubt that a great many more instances of the occurrence of this species in Northamptonshire have taken place than those I have mentioned above; the abundance of winter berries in most parts of the county ought to attract them; but, as I have before said, ornithological records are lamentably wanting amongst us, and I feel convinced that our list of Northamptonshire birds might be increased, on excellent authority, by at least fifty species, if only a few of those persons who possess some knowledge of ornithology would take the trouble to keep careful notes, and publish their observations, with the exact dates and localities, of any unusual occurrences. I do not of course, expect that our list of birds can ever rival those of the eastern counties; but I earnestly wish to rouse the emulation of our native naturalists in this respect.

# COAL.

[This account of Coal had not been finally revised, when the writer was seized with an illness which ended on January 28 in his death. Some of his last thoughts were given to this account, but he was too weak to revise the printer's proofs or to explain fully certain alterations and additions which he desired to make.]

It is probable that very little knowledge as to the nature and history of Coal is possessed by the general public; and certainly very erroneous notions are entertained by some. I have thought, therefore, that information upon the subject of Coal, drawn from authoritative sources—Professor Hull, LLD., F.R.S., Director of the Geological Survey of Ireland; Professor Williamson, F.R.S., of Manchester; Mr. Carruthers, F.R.S., Head of the Botanical Department, British Museum; Royal Coal Commission, 1871; Mining Record Office; etc.—would not be without interest and utility.

What Coal is.—Coal is a vegetable substance, chiefly that of a particular class of plants (vascular *Cryptogams*), which has been "mineralised" into its present form by the separation of carbonic acid and water, under the conditions, during immeasurable periods of time, of heat, moisture, and immense pressure.

Coal consists of two distinct kinds—ordinary Coal, in its numerous varieties, such as is used for domestic, manufacturing, and other familiar purposes; and "*Anthracite*" (from the Greek *anthrax*, coal or charcoal), or "non-bituminous," or "steam" Coal, such as is used frequently in ocean steam-ships. The distinction is shown by the following analyses :—

*Analysis of Coal from Five several Coal-fields of England and Scotland.*

| Carbon. | | Hydrogen. | | Oxygen and Nitrogen. | | Earths. | |
|---|---|---|---|---|---|---|---|
| Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. |
| 89·2 | 79·1 | 7·2 | 5·3 | 14·5 | 5·5 | 2·9 | 0·5 |

*Analysis of Anthracite from Pembrokeshire.*

| Carbon. | Hydrogen. | Oxygen. | Nitrogen. | Earths. |
|---|---|---|---|---|
| 94·10 | 2·39 | 1·34 | 0·87 | 1·30 |

The difference is marked by the smaller amount of solid carbon and the greater amount of volatile constituents in *Coal*, and by the greater amount of solid carbon and the smaller amount of volatile constituents in *Anthracite*: so that the latter gives off little smoke, and does not flame, burning something like charcoal; hence its name, and hence also its superiority as a "steam" Coal for ship purposes.

THE COAL FLORA.—The number of species of fossil Coal Plants has been estimated to be 879; but this estimate is not entirely to be relied upon, as few species have been accurately determined, and in not a few instances supposed distinct species have been found to be parts of the same plant. Thus, it is possible that future discovery may materially reduce the present estimate in this direction, although it may add to it in another.

These 879 species have been classified as :—*Cellular Cryptogams*, such as Fungi, Algæ, &c., 13 species; *Vascular Cryptogams*, such as Ferns, Calamites, Lepidodendra, Sigillariæ, &c., 772 species; and *Phanerogams*, such as Conifers, &c., 94 species. Although the absolute numbers here given are to a certain extent unreliable, it is probable that they represent nearly the actual proportionate rarity or abundance of each group.

The *Fungi*, *Algæ*, &c., on account of their structure and scarce occurrence, have not contributed appreciably to the substance of Coal.

*Ferns* were very prolific in the Coal period, numbering 140 supposed species in the beds of this country alone; but the greater proportion were of small forms, and many probably *epiphytic*, growing parasitically, like the *Platycerium*, on the soft moist outer covering of other Coal plants, and damasking with their beautiful impressions the under-surface of the Shale which roofs in many a Coal seam. Other species of Ferns were allied to, but were not on a larger scale than, the "Tree" Ferns, such as *Alsophila*, *Cyathea*, *Dicksonia*, and other kinds; which in the present day abound in Ceylon, Australia, New Zealand, and other tropical and warm regions and islands, chiefly in the Southern Hemisphere, and attain to heights varying from 30 to 50 feet, having a spread of fronds of commensurate magnitude. Fronds are never found attached to the stems of these fossil Tree Ferns, the stems themselves being rare in Coal; to the mass of which, it is evident, Ferns did not make a large addition.

*Calamites* constitute one of those remarkable groups of which the Coal forms, although represented in the present day by diminutive plants, attained to tree-like magnitudes. Stems of Calamites have been found exceeding 24 feet in length: yet the genus is closely allied to the humble *Equisetaceæ*, the familiar "Horsetails" of our swamps and ponds. Calamites, although not scarce, contributed only a subordinate contingent to the bulk of Coal.

*Sigillariæ* and *Lepidodendra* were of distinct but allied genera, and they exhibit the most remarkable phenomena in connection with the Coal Flora. They have for their modern representatives the *Lycopodiaceæ*, including the "Club-moss;" which, by the way, is not a moss at all, but only moss-like. The Lycopodiums are generally of a trailing habit; in warm climates, however, some species are erect, such as *Lycopodium densum* of New Zealand,

which yet attains only to a maximum height of three feet. But these *Lycopodiaceæ* (or Lycopodites) of the Coal period attained to the altitude and dimensions of some of our largest timber trees. An individual *Sigillaria* has been found near Newcastle seventy-two feet in length, and a *Lepidodendron* from Jarrow has been described as being more than forty feet in length, and as having a diameter near the base of thirteen feet. These colossal Lycopodites of themselves contributed the great bulk of the substance of Coal, not only from their tree-growth, but also in another way. The *Sigillariæ* and *Lepidodendra*, in common with the *Ferns* and *Calamites*, shed the minute grains called *spores* (which are not true seeds, although performing the functions of seeds), and in such abundance that, in some Coal seams, beds of considerable thickness are almost entirely made up of these spores and the *sporangia*, their cases.

Of *Conifers*, although as many as 94 species have been enumerated, the great majority appear to have been of forms represented by the present *Auracaria* or *Norfolk Island Pine*. The small three-ribbed body called *Trigonocarpum*, which occurs in great numbers throughout the Coal Measures, is the earthy inorganic cast of the interior of the outer case of the seed probably of a Coniferous plant. Other forms of Conifers occur; but these are not of such importance as to be noticed now. In some exceptional seams the mass of the Coal has been largely composed of the material of Conifers, although these are not considered to have contributed largely to the aggregate amount of Coal. The Conifers of the Coal period are supposed not to have grown upon the actual Coal areas, but to have been conveyed thither by agencies to be hereafter referred to.

There were doubtless numerous genera and species of plants other than those I have mentioned, which flourished in the Coal period; but few of these have left sufficient traces to allow of classification. It is probable, also, that, in the ancient Coal forests, sedges, reeds, marsh grasses, and the like, grew and filled up the ground spaces between the great tree-growths described. But of all the multitude of these plant-forms (as Professor Williamson has said), "the *Sigillaria*, *Lepidodendra*, and *Calamites*, appear to have formed the greater mass of Coal."

During the Coal period there were no timber trees; and, notwithstanding the existence of a very few botanically flowering Conifers, "we may," as Professor Williamson says, "fully accept the opinion of Hugh "Miller that this was a 'flowerless vegetation.' We feel pretty certain "that those orders of plants which refresh our senses with their flowers "and fruits existed not in the true Coal period. There is every reason for "believing that the *Rosaceæ*, *Leguminosæ*, and a few other tribes, adapted

"to charm the eye and minister to the wants of Man, only appeared as the "harbingers of Man himself."

THE FAUNA OF THE COAL FORESTS.—The life-forms of the Coal Forests were such as were likely to be associated with warm moist land-surfaces, and were in agreement with the peculiar character of the vegetation described. Among remains identified are those of—Crickets, Cockroaches, Beetles, White Ants, the wing of one of the Ephemera, allied to the May-fly (nearly four inches long), Grasshoppers or Locusts, a Mantis, and other insects, Spiders, a large Arachnoid species (*Eophrynus Prestwichii*), Centipedes, Scorpions, and other Myriapods, land Snails (a *Pupa* and a *Helix*), and probably a land Reptile.

Of the same Geological period as, but distinct from, the Land Fauna described, was an *Aquatic Fauna* (fresh-water, estuarine or migratory, and marine), which included very many genera and species of Bivalve and Univalve Mollusca, Shelled Annelides, 12 species of Cephalopoda (such as *Nautilus*, *Goniatites* allied to *Ammonites*, &c.,) several genera of Echinodermata, minute Bivalve Crustaceans, other Crustaceans, some allied to the modern King Crab, numerous Fishes, and nearly 20 genera of Amphibian and Batrachian Reptiles, including *Archegosaurus* (Primordial Lizard), which Owen has placed between Fishes and Reptiles as allied to both.

THE FORMATION OF COAL.—In Great Britain, indeed in every part of the world in which Coal has been discovered, it is found to occur in a vertical alternating succession of Coal-seams and sedimentary beds, generally of shale, but occasionally of more sandy material, varying in different Coal-fields as to the thicknesses and number of such seams and beds.

*Areas of Coal Forests.*—From the nature of the vegetable growths which I have described, it is evident that the Coal Forests flourished in climates varying from a warm temperature to a tropical heat, and on areas of vast deltas, swamps, and marshy plains or savannahs, such as "the great "swamps at the estuary of the Mississippi, and those along the coasts of "Louisiana, Nova Scotia, and the tropical lagoons of the African coast;" such areas having been sometimes overflowed by fresh-water (probably held back by high tides), the Coal plants being such as to be unaffected by these transient and partial submersions. The Conifers, as I have said, grew, not in the Coal Forests, but upon higher grounds; and, fragments only having been found in Coal, these, with some cones and seeds (*Trigonocarpum*), were doubtless carried down to the Coal areas by flood-waters and streams. It is possible, therefore, that the *Flora* of the higher areas during the Coal period may have been abundant, and of a higher grade than that of

*Cryptogams;* but for the greater part they are unrepresented by such remains as are now accessible.

*Alternating Shale Beds.*—All Coal-seams rest upon stratified beds, generally of shale but sometimes of sandstone or sandy material; in which are commonly found the roots or stools of the *Lycopodiaceous* plants which form the substance of the Coal above. From the fossil contents of these beds, it is concluded that they were deposited in water, generally fresh, but sometimes estuarine or marine. The Shale beds were once fine mud, and their being laminated indicates "a slow and tranquil deposition." The other like intervening beds, however, consist of sandstones which were once sand. These "are frequently rippled and "obliquely laminated, showing the presence of currents: they also contain "the fragments of drifted plants." The thin layers of the Shale beds frequently exhibit on their surfaces ripple-marks, and even the impressions of rain-drops, made while their substance was yet in a soft and impressible condition.

*Physicial Conditions under which Coal was Formed.*—Every portion of the Earth's surface has been subjected to alternate elevation and subsidence. Darwin has described the occurrence, upon the Eastern coasts of South America, of a succession of terraces which rise in tiers from the present sea level to a height of 1,200 feet. These are indications that, for a long period, each of these terraces was in turn subjected to the action of the waves. The whole, from the highest terrace down to the level of the ocean, has been under the sea, and has been slowly elevated to its present position; each terrace or coastline marking a long pause in such elevation. Now, every Coal area has been subjected to a process analogous to, but the reverse of, that I have described—a slow and gradual subsidence broken by long pauses, each pause being marked by the formation of a seam of Coal. Such seam was formed in this way—a warm low-lying tract, such as I have described as "deltas, swamps, and marshy plains or savannahs," was covered with luxuriant growth, and ultimately became a forest of huge Cryptogamic trees, &c., which flourished and died, generation after generation, for hundreds of years; "their leaves, branches, and trunks, "falling around, and gradually accumulating, till the pulpy mass attained "to a thickness of 20, 50, or 100 feet." Subsidence had probably set in ere this, and accelerated the decadence of the ancient forest; and continuing for many centuries, waters for all that time flowed over the sunken area, and throwing down their sedimentary deposits of mud, sand, or silt, "stratum after stratum accumulated, until the vegetable pulp was subjected "to the pressure, it may be, of thousands of feet of solid matter. Chemical "as well as mechanical changes ensued; and in process of time, what was

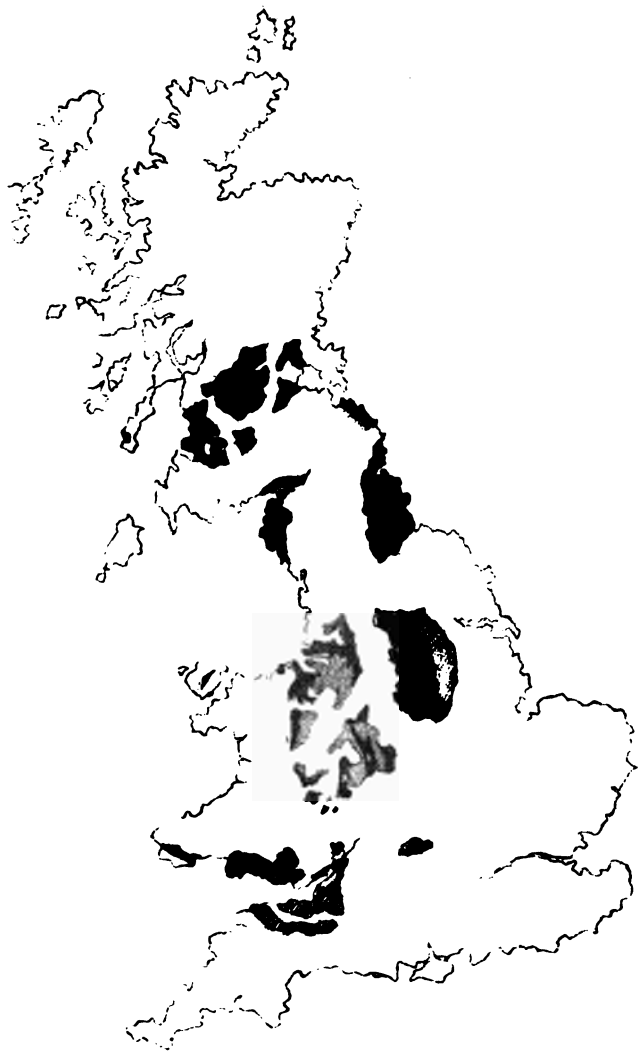
"once a forest was changed into a bed of Coal." At length, subsidence was arrested, and the surface of the area having been raised by sedimentary accumulation to its former level, again was a Cryptogamic forest formed, which flourished, died out, was buried as before, and converted into another Coal-seam. The same processes and changes were repeated time after time, and as many times as there are Coal-seams, until great Geological revolutions had been gradually accomplished, and the succeeding Geological age, the Permian, had commenced.

*The Duration in Time of the Coal Period.*—After very close reasoning, by eminent Geologists who have specially studied the subject, it has been concluded that it would require a thousand years of Coal-forest growth to form a bed of Coal one yard in thickness. Other Geologists, from data gathered from deposits formed at the mouths of the Ganges and some other great rivers, have also arrived at the conclusion that the intervening sedimentary beds were deposited at an average rate of not more than two feet in a century. The Coal-field of South Wales has upwards of 80 distinct Coal-seams, which have an aggregate thickness of Coal of 120 feet, or 40 yards; the growth of the vegetable material of which, therefore, must have taken 40,000 years. The sedimentary beds associated with these seams have an aggregate thickness of 12,000 feet, the accumulation of which, at the rate of two feet in a century, represents a lapse of time of 600,000 years—thus 40,000 plus 600,000 = 640,000 years. In the North of England the Coal-bearing strata reach the enormous thickness of 18,000 feet; and the still longer period of more than 900,000 years is assigned to their formation.

*The Vast Area and Immensity of Time represented by the Growth of Coal Plants.*—The presence of Coal and Coal-plants in the Arctic regions, as far North as the 78th degree of latitude, indicating at the time of their growth, instead of an Arctic, an almost tropical climate, presents a phenomenon so anomalous as at present to admit of no satisfactory explanation. South of this, Coal occurs, in various countries in the Northern Hemisphere, throughout an area spreading over some 50 degrees of latitude, traversing Europe from its Eastern to its Western boundary, and stretching across the Atlantic and over America as far as the Rocky Mountains. Coal also has been found in India; and in the Southern Hemisphere, in Brazil, Australia, and New Zealand. This immense area, representing the wide distribution of Coal-plants, is not so remarkable as the fact that the same genera and species not only ranged throughout that area, but through the whole vertical series of Coal strata, which attained to a maximum thickness, in this country, as has been shown of 18,000 feet, and represent a passage in time of 900,000 years. Throughout the duration of these almost incomprehensible ages, these Coal-plants, humble though they were in the scale of

A

Map of Great Britain
The shaded portions showing the areas originally covered by Coal Measures.
From Hulls Coal-Fields of Great Britain, 4th Edit:



Areas of Present Coalfields,
Approximately taken from Hull's Coal-fields
of Great Britain, 4th Edit.
Darker Shade, Coal of a depth under 2000 ft.
Lighter Shade, Coal of a depth between 2000 & 4000 ft.

vegetable organisms, remained unchanged, presenting a persistent uniformity to which there is no parallel in the history of the Earth's Flora.

ORIGINAL AND PRESENT COAL AREAS OF GREAT BRITAIN.—The present Coal-fields of Great Britain are more than 20 in number, and vary greatly in size, some stretching through considerable tracts of country, and others consisting of mere patches of limited dimensions. Coal, however, when originally formed, was not so distributed; but was grouped in this country (omitting Ireland as yielding a comparatively unimportant amount of Coal) into two great Coal-fields, divided by a range of elevated land-surface (composed chiefly of the older Palæozoic rocks) which stretched East and West across what is now Britain, from the St. George's Channel to the North Sea, and "which has left," as I said in a recent Paper, "its sub-aërial expression in the lower Palæozoic rocks of Charnwood Forest." Of these Coal-fields, the Northern comprised about one-third of the area of Scotland and one-third of the area of England, and the Southern more than one third that of the latter country. [See Map A.]

Towards the close of the Coal period, "terrestrial movements took place "over the whole of the British Islands, and the neighbouring parts of the "continent of Europe, arising from the contraction of the Earth's crust, due "to the secular cooling thereof." The forces took the form of lateral pressure; which acting in nearly a North and South direction, produced flexures, or immense corrugations, ranging nearly East and West, or at right angles to the direction of pressure. Of these, the greater ridges, or "anticlinal axes," traversed by fissures, became subjected to immense denudation, which swept away and destroyed a very considerable proportion of the pre-existing Coal-beds. Subsequent to these changes, and "over the "bent and denuded surfaces and basset edges of the Carboniferous Strata," the Permian rocks were deposited. Again, at the close of the Permian period, other but like terrestrial movements took place, but along lines nearly North and South, and nearly at right angles to those of the previous age; and these were accompanied or immediately followed, as before, by great denudation, chiefly along the ridges of the great corrugations, which still further devastated the even then ancient Coal-beds. The intersection of these two systems of flexures, produced the basin-shape of the present Coal-fields, and left them very nearly the same, as to distribution, number, and contained Coal, as we now know them to be. [See Map B., reduced from Hull's Map, Coal-fields of Great Britain, 1881.] During subsequent Geological periods, other terrestrial disturbances took place, and again denudation; but comparatively to an unimportant extent.

The cumulative effect of all these Geological phenomena or natural operations, although by their means an immense proportion of the original

quantity of Coal has been lost, has been, by the breaking up of the horizontality of the Coal-beds, resulting in the inclination of Coal-seams and their intersection by faults, and by the removal by denudation of many thousands of vertical feet of superimposed formations, to bring within workable reach such proportion of the remnant of Coal left as is within a certain limit of depth, but which would otherwise have been inaccessible.

THE PROBABLE DURATION OF BRITISH COAL SUPPLY.—The Coal contained in the Coal-fields of this country is to be classed under two-heads —the available and the unavailable. The former is also divisible into—such Coal as is now within reach of mining operations, and such Coal as may reasonably be anticipated, with the advance of scientific appliances, to be, in the future, capable of being brought within the reach of mining operations. The former has been termed the "visible" or accessible Coal, the latter the "concealed" or possibly accessible Coal.

The *accessibility* of Coal is to be determined by two considerations—the physical possibility of extracting, or "winning" it, and the profitable result of its extraction.

The physical possibility depends upon the temperature of the atmosphere and of the solid strata at the depth at which Coal is to be worked, and upon the available means for reducing that temperature. In this country, at a depth of from 30 to 50 feet from the surface, the temperature remains invariable all the year round (the "temperature of no variation"), and may be taken at a mean of 50 degrees Fahrenheit. This temperature, attributable to the high temperature of the interior of the Earth, has been found from an immense number of experiments, to increase variably, but at a mean of one degree for every 60 feet of descent. The deepest mines of Great Britain are —Dukinfield, Cheshire, 2,151 feet, temperature at bottom 75 degrees; Rose Bridge Colliery, Wigan, depth 2,424 feet, temperature 79 degrees; and the Ashton Moss Colliery, 2,690 feet, temperature 80 degrees. The last is the deepest mine in England, was commenced in 1874, and was opened this year, 1881. The temperatures cited are those of the open workings; but the temperatures of the undisturbed Coal strata may be taken at about 17 per cent. higher. These results vary somewhat from those adduced from experiments, which would give a temperature of 91 degrees at a depth of 2,500 feet.

*Ventilation* is a factor to be taken into account; and the effect of this in lowering the temperature of a mine, depends greatly upon the season (i.e. the temperature of the external atmosphere), the depth of the mine, the length of the workings, and the rapidity of the circulation through them of the ventilating air. The deeper the mine, the less the cooling effect of ventilation.

Another factor, depending upon the depth of a mine, is the density of the Coal itself, increased by great pressure in deep mines, which renders both its cooling and excavation much more difficult.

*Store of "Visible" Coal.*—Taking the depth of the deepest Coal-mine as the limit in depth of the "visible" or available Coal in this country, it has been calculated that at the present time there remains a store of such Coal amounting in quantity to something under 80,000,000,000 tons.

*Store of "Concealed" Coal.*—It is anticipated that means may be devised for working Coal down to a depth of 4,000 feet, at which depth, the temperature will be about 116 degrees. This is considered to be the lowest depth at which Coal can ever be excavated. It has been estimated that the quantity of Coal between these two limits ("concealed" Coal) amounts to about 56,000,000,000 tons, or 136,000,000,000 tons in all.

*Rate of Consumption of Coal.*—An accurate record of the amount of Coal annually raised from British Coal-mines has been kept at the Government Mining Record Office since the year 1854. This Record shows that in that year the "out-put," or quantity of Coal raised, was 64,661,401 tons; and in 1860, 84,042,698 tons—exhibiting an increase in the six years of 19,381,297 tons, or 30 per cent. In 1870, the "out-put" was 110,431,192 tons—an increase in the ten years of 26,358,494 tons, or 31⅓ per cent. In 1880, the "out-put" was 146,818,622 tons—an increase in these last 10 years of 36,387,430 tons, or 33 per cent.

*Duration of Coal at the Present Rate of Increase in Consumption.*—At the rate of increase of the last ten years, 33 per cent., our present stock of "visible or available" Coal, that within the limit of the depth of our deepest Coal-mine, 80,000,000,000 tons, will be exhausted in about 180 years. If we ignore the intervening difficulties, and assume that it will be possible hereafter, as is suggested, to extract (or "win") Coal from as great a depth as 4,000 feet, even then, with the addition of the 56,000,000,000 tons of "concealed" Coal, at the present rate of increase of consumption, would the whole estimated stock of Coal be exhausted in less than 200 years.

*Rates of Increase in Consumption will not be Maintained.*—Although the ratio of increase in the consumption of Coal has been so uniform, so constant, for the 26 years that an accurate record has been kept, it is by no means certain that that ratio of increase will be maintained in the future; in fact, it is certain that it will not. There must be a limit to the increase of population upon an area so small as that of this country, and with it to the domestic consumption of Coal; also must there be a limit to the expansion of manufactures and commerce; and the smelting of metals, under such a ratio of increase, would, at no distant period, exhaust all the ores in the land. Moreover, substitutes will probably be found. Other motor forces

will doubtless to some extent supersede steam, as already electric lighting threatens to replace gas.

*Period of Exhaustion Remote.*—In the far distant future, when all or nearly all the "visible" Coal has been extracted, and that lying between the depths of 2,000 and 4,000 feet has to be resorted to, the great increase in the difficulty of Coal-mining, and the consequent great increase in the cost of Coal, will enforce the avoidance of the present lamentable waste both in raising and using Coal, and every form of economy will be employed, the consumption of Coal will be further and further restricted, and will present not an increasing but a diminishing ratio—the period of exhaustion will become more and more remote, and will still recede.

SAML. SHARP.

Great Harrowden Hall,
September, 1881.

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ERRATA.—In the article on Stellaster Sharpii, Journal No. 8, for—"Cardium Cognaturm" read "Cardium cognatum;" for—"joints" (page 322, line 15) read "joint;" for—"Greenstone" (page 324, line 18) read "Greensand."

## METEOROLOGICAL REPORT FOR OCTOBER, 1881.

The month of October will be long remembered for the great storm of the 13th and 14th. The Barometer fell for several days previously, and on the 11th the temperature which had been increasing reached its maximum. The morning of the 13th was bright and fine, but toward noon the sky was covered with clouds, and in the afternoon rain began to fall accompanied by a high wind from the S.W., which gradually developed into a strong gale. During the night the rain fell heavily, but ceased early on the morning of the 14th, the power of the wind, however, continued to increase until mid-day, when it appeared to have reached its maximum, blowing nearly due W. In the afternoon it veered to the N.W., and a few hours later, though still blowing hard, its force had perceptibly diminished. The damage done to timber was very serious. The trees which were in their full autumn beauty, were ruthlessly stripped of their foliage, the ground was strewn in every direction with broken branches, and many large trees were blown up by the roots, especially in low-lying and damp situations where the roots had been loosened by the heavy rains of the previous night. The elms, as usual, were the principal sufferers.

The remainder of the month was of an ordinary character, and suitable for getting on with agricultural work, which accordingly made rapid progress. A little snow fell in various parts of the county on the last two days of the month. The Rev. H. Waller reports from Twywell that the first snipe was seen on the 26th, and the first field-fare on the 27th.

## METEOROLOGICAL REPORT FOR NOVEMBER, 1881.

Snow fell again on the 1st of November, rather heavily at Pitsford, but the weather soon became unusually warm and genial, the maximum temperature being reached in most places on the 4th or 5th. The month on the whole was open and genial, with the exception of the stormy weather on the 24th, 25th, and 26th. On these days rain fell heavily, and on the 26th a terrific gale set in about three p.m., and lasted with little intermission for 39 hours, although not "long foretold" by the Barometer which fell on this day half-an-inch between nine a.m. and nine p.m.

## METEOROLOGICAL REPORT FOR DECEMBER, 1881.

The month generally was remarkably open and mild for the time of year. The Rev. H. Waller reports that spiders were seen sitting in their webs at the close of the year, and that a Diorniensis rose had fresh blooms upon it on the last day of December in the open air. Slight frost however, set in on the 9th, 10th, and 11th, accompanied by heavy fogs, which freezing on the roads rendered locomotion difficult. The 24th was also fine and frosty, and a little skating was to be had on the meadows, but unfortunately the frost broke up and rain fell on the afternoon of Christmas day.

## OCTOBER, 1881.

| STATION. | OBSERVER. | RAINFALL. Total for Month. | Total for Year. | Greatest Fall. In. | Date. | Wet Days. | SHADE TEMPERATURE. Maximum. Deg. | Date. | Minimum. Deg. | Date. |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 2·87 | 20·06 | ·88 | 13 | 17 | 59 | 10 | 29 | 30 |
| " .. | S. Law..... | 2·92 | 20·48 | ·82 | 13 | 17 | 60 | 11 | 23 | 17 |
| Castle Ashby .. | R. G. Scriven..... | 2·88 | 22·18 | ·87 | 13 | 11 | 61 | 11 | 30 | 17 |
| Weedon ..... | R. Capell ..... | 3·15 | 22·87 | 1·03 | 13 | 12 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 3·39 | .. | 1·01 | 13 | 17 | 67 | 13 | 24 | 16 |
| Rothwell ..... | J. More, M.D..... | 3·14 | 19·87 | ·87 | 13 | 16 | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | 3·52 | 22·67 | ·99 | 13 | 15 | .. | .. | .. | .. |
| Towcester ..... | J. Webb ..... | 3·07 | 22·42 | ·86 | 22 | 14 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 2·97 | 21·47 | ·90 | 13 | 15 | 55 | 11 | 31 | 16 |
| Fawsley ..... | Lady Knightley.... | 2·91 | 21·64 | 1·00 | 22 | 16 | 56 | 11 | 23 | 30 |
| Thorpe Man'ville | Seth Barnes ..... | 3·99 | 24·92 | 1·35 | 22 | 17 | 63 | 2 | 25 | 17 |
| Helidon ..... | C. J. Holthouse.... | 3·06 | 22·49 | 1·14 | 22 | 13 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 2·98 | 22 86 | 1·02 | 14 | 18 | .. | .. | .. | .. |
| Average 15 years 1866-80 ..... | H. Terry ..... | 2·41 | 21·71 | .. | .. | .. | .. | .. | .. | .. |

## NOVEMBER, 1881.

| STATION. | OBSERVER. | RAINFALL. Total for Month. | Total for Year. | Greatest Fall. In. | Date. | Wet Days. | SHADE TEMPERATURE. Maximum. Deg. | Date. | Minimum. Deg. | Date. |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 2·91 | 22·97 | ·53 | 24 | 19 | 57 | 5 | 30 | 1 |
| " .. | S. Law..... | 2·74 | 23·22 | ·51 | 25 | 18 | 51 | 4 | 27 | 2 |
| Castle Ashby .. | R. G. Scriven..... | 2·95 | 25·13 | ·60 | 24 | 19 | 61 | 4 | 33 | 1 |
| Weedon ..... | R. Capell ..... | 3·34 | 26·21 | ·59 | 25 | 17 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 3·02 | .. | ·62 | 25 | 17 | 66 | 21 | 31 | 1, 17, 18 |
| Rothwell ..... | J. More, M.D..... | 2·47 | 22·34 | ·64 | 25 | 14 | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | 2·65 | 25·32 | ·54 | 24 | .. | .. | .. | .. | .. |
| Towcester .... | J. Webb ..... | 3·16 | 25·58 | ·56 | 25 | 18 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 2·96 | 24·43 | ·56 | 24 | 19 | 57 | 4 | 31 | 1 |
| Fawsley ..... | Lady Knightley .. | 2·80 | 24·44 | ·38 | 24 | 20 | 55 | 5 | 28 | 1, 17, 29 |
| Thorpe Man'ville | Seth Barnes ..... | 3·61 | 28·53 | ·59 | 24 | 20 | 58 | 12 | 28 | 1 |
| Helidon ..... | C. J. Holthouse.... | 2·85 | 25·84 | ·35 | 24, 30 | 18 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 2·89 | 25·75 | ·67 | 25 | .. | .. | .. | .. | .. |
| Average 15 years 1866-80 ..... | H. Terry ..... | 2·19 | 23·91 | .. | .. | .. | .. | .. | .. | .. |

## DECEMBER, 1881.

| STATION. | OBSERVER. | RAINFALL. Total for Month. | Total for Year. | Greatest Fall. In. | Date. | Wet Days. | SHADE TEMPERATURE. Maximum. Deg. | Date. | Minimum. Deg. | Date. |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 2·89 | 25·86 | ·83 | 17 | 13 | 50 | 6 | 20 | 23 |
| " .. | S. Law ..... | 2·65 | 25·88 | ·80 | 17 | 13 | 48 | 2 | 19 | 23 |
| Castle Ashby .. | R. G. Scriven ..... | 3·05 | 28·18 | ·92 | 17 | 14 | 50 | 6 | 22 | 23 |
| Weedon ..... | R. Capell. ..... | 3·37 | 29·58 | 1·00 | 17 | 14 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 3·22 | .. | ·91 | 17 | 16 | 52 | 2 | 18 | 23 |
| Rothwell ..... | J. More, M.D ..... | 2·77 | 25·11 | ·50 | 19 | 13 | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | 2·32 | 27·64 | ·78 | 17 | 12 | .. | .. | .. | .. |
| Towcester ..... | J. Webb ..... | 3·36 | 28·94 | 1·05 | 17 | 16 | .. | .. | .. | .. |
| Little Houghton | J. Brawn.... ..... | 2·04 | 27·46 | ·91 | 17 | 14 | 43 | 3 | 25 | 23 |
| Fawsley ..... | Lady Knightley .. | 3·43 | 27·87 | ·84 | 17 | 17 | 46 | 2 | 19 | 22 |
| Thorpe Man'ville | Seth Barnes ..... | 4·05 | 34·33 | ·97 | 17 | 17 | .. | .. | .. | .. |
| Helidon ..... | C. J. Holthouse.... | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 3·02 | 28·77 | ·82 | 18 | 12 | .. | .. | .. | .. |
| Average 15 years 1866-80 ..... | H. Terry ..... | 2·27 | 25·95 | .. | .. | .. | .. | .. | .. | .. |

HENRY TERRY, SURGEON.

# THE FLORA OF NORTHAMPTONSHIRE.

*(Continued.)*

By G. C. Druce, F.L.S.

Cucurbitaceæ.

513. Bryonia dioica, L. White Bryony.

In hedges and thickets, generally distributed as at Brampton, Gayton, Danes' Camp, etc., Nene a; Great Billing, etc., Nene b; Glapthorn, Thornhaugh, Nene c; Bozenham Mill, Yardley Gobion, Ouse; Barnack, Brampton Ash, etc., Welland; Sulgrave, Cherwell; Yelvertoft, Avon.

The Bryony is a climbing plant and its cluster of numerous red berries adorn our hedgerows in early autumn; its medicinal properties are of a powerfully cathartic character, the root being the portion employed; it is however, now discarded by all save homœopathic practitioners. The dried roots have been sometimes sold for Mandrake (Mandragora Officinalis) a very different plant.

Tennyson says :—

> Or when I feel about my feet—
> The berried bryony fold.
> Green tendrilled plants in many a ring,
> Creep o'er the green hedge tenderly,
> As if in very love to cling.

Grossulariaceæ.

*514. *Ribes Grossularia*, L. Gooseberry. Hedges, thickets, on pollard willow, etc. Widely distributed, but not common.

Danes' Camp, Wootton, Collingtree, Nene a; Delapre, Wollaston, Ecton, Nene b; Thrapstone, Fotheringhay, Nene c; Paulerspury, Moorend, Yardley Gobion, on pollard willow, Ouse; Middleton, Daigley, Welland; Staverton Glen (Notcutt), Avon.

The wild form of the common gooseberry is not unfrequent throughout England, but it is scarcely considered to be indigenous. Some seven hundred varieties are cultivated.

(Ribes alpinum, L. Planted behind Grimsbury Mill (French), Cherwell, and also at Castle Ashby.)

*515 Ribes rubrum, L. Red Currant.

Dallington Spinney (plentiful), Farthingstone Castle Dykes, Nene a; Warmington, Nene c; Alderton, Ouse; Rockingham, Welland.

The uses of the Red Currant are too well known to need description. The White Currant of our gardens is but a variety of the original colour.

*517. Ribes nigrum, L. Black Currant.

Kingsthorpe, river side (Morton Hist.), Bury Wood, Nene a.

Rare and very doubtfully wild in either locality. The uses of the black, as of the red currant are well known. A lozenge is prepared from the inspissated juice of the fruit mixed with sugar; and the compiler of the Throat Hospital Pharmacopeia, has made this, and a similar one prepared from the red currant, a base for the various medicaments used in the form of a lozenge, since by dissolving quicker than the ordinary sugar and gum lozenge the throat receives more benefit.

Crassulaceæ.

520. Sedum Telephium, L. Orpine. Wood, rare.

Badby (B), Preston Capes (M H), Farthingstone, Castle Dykes, Nene a; Grendon Wood (Miss Brent), Nene b; Thornhaugh (Berkeley), Cliff Wood (Lewin), Nene c; Marholm (Paley), Wakerley (Jones), Welland; Thenford (Nene d, and Beesley), Cherwell.

Mr. Rogers found a plant at Maidford which he considers to be the variety, *Fabaria*.

This plant is an astringent and has been used for diarrhœa. The specific name is derived from Telephus the son of Hercules, who is said to have discovered its properties.

*522. Sedum album, L. White Stone crop. On walls, not uncommon; Lamport, Duston, Litchboro', Weedon, Adstone, Nene a; Castle Ashby, Wollaston, Nene b; Fotheringhay, Higham Ferrers, Nene c; Yardley Gobion, Grafton Regis, Ouse; Stoke Albany, Welland; Overthorpe, Aynhoe, Parkwall, Nene d; Byfield, Cherwell; Yelvertoft, Avon.

These are all the variety *teretifolium*.

*523. *Sedum dasyphyllum*, L. Walls, rare.

Maidwell (W. Lewin), Nene a; Rushton, Brigstock well (Lewin).

525. Sedum acre, L. Golden Stonecrop. On walls. Common and generally distributed. A beautiful ornament to old walls, as near Brampton, etc., when in flower particularly brilliant.

Wordsworth writes:—

"And that bright weed—
The Yellow Stonecrop, suffered to take root,
Along the windows' edge profusely grew,
Blinding the lower panes."

*527. *Sedum reflexum*, L.

Newnham, Badby, Kislingbury, Upton, Nene a; Grendon (Brent), Castle Ashby (Rogers), Pytchley (Lewin), Weldon, Nene b; Canal bank, Grafton Regis, plentiful, Ouse.

(528. *Sedum rupestre.* Hudson.)

(529. *Forsterianum*, Lin. Were both recorded in Baker's History, probably from *reflexum* being mistaken for these species. And from Grendon, Strixton, and Woodford. *Forsterianum* is also probably this species.)

*530. *Sempervivum tectorum*, L. Houseleek. Walls, and cottage roofs. Not wild.

Duston, Roade, Nene a; Grendon, Finedon, Irchester, Yardley Hastings (Rogers), Nene b; Tansor, Nene c; Potterspury, Ouse; Barnack, Welland.

The thick succulent leaves of the Houseleek are often used to bruises, burns, and scalds. Its frequency on house tops may be owing to the old belief that it prevented lightning striking the house; Linneus was of opinion that it preserved the thatch.

*531 Cotyledon umbilicus, L. Navel-wort. Walls. Very rare.

Kingsthorpe (Baker), there in 1879, on wall, above well; Brampton (M. H.), seen on Brampton bridge in 1878; Dodford (B), could not find it in 77-78 or 79; Litchboro' (M. H.), still abundant, almost every wall being covered with it; Canon's Ashby, on the walls of Sir Henry Dryden's house, still plentiful, Nene a. About Delapre (M. H.), I have been unable to find it, Nene b; Peterboro' Cathedral precincts (M. H.), I have carefully searched, but without success, Nene c.

The Navel-wort has been employed in Epilepsy, and is still occasionally used in Wales; the plant is used for the eye. in Northamptonshire, an ointment is prepared from the leaves, which is said to be possessed of the most healing properties.

540. Saxifragra tridactylites, L. On Walls. Locally common.

Dallington, Kingsthorpe, Northampton Castle walls, Floore, Norton (B), Horton, Ashby St. Ledgers, Badby, Pattishall, Gayton, Nene a; Weston Favell, Mears Ashby, Weldon, Doddington, Cogenhoe, wall by Victoria Walk, Northampton, Castle Ashby (Rogers), Nene b; Stanion, Glapthorn, Tywell, Fotheringhay, Nene c; Cosgrove, Alderton, Yardley Gobion, Ouse; Rockingham, Brampton Ash, Collyweston, Welland; Canons' Ashby, Daventry (Notcutt), Cherwell; Yelvertoft, West Haddon, Avon.

The viscid red glands on this plant possess in a smaller degree, similar powers to those of the Drosera, in catching, retaining, and assimilating small insects, and I have discovered minute traces of Pepsine in the leaves. The

plant when growing, as it generally does with us, on some wall top, has the glands much more developed than when growing in shadier and moister situations, and few plants can be gathered without some insect or other attached to the viscid glands.

Another of the insect-eating plants, the Butterwort, has been long used in Sweden, etc., to curdle milk instead of Rennet, and Gerarde says, "in Cheshire, where I was born, and where the best cheese of this land is made," that this Saxifrage was used for the same purpose.

543. Saxifragra granulata, L. Gravelly meadows. Local.

Dallington, Kingsthorpe, Race-course, Duston, Norton (B), Nene a; Great Billing (B), Overstone (Birch), Grendon (Brent), Cogenhoe, Kettering (Lewin), Irthlingboro', Rushton, Nene b; Drayton reservoir (Notcutt), Avon.

A very lovely flower, common in some of the Dallington meadows, and generally found on a gravelly soil. The hairs on the stems, like those of some of the mountain species are extremely sensitive to ammoniacal solutions. The granular tubers near the root are very curious, and to our ancestors suggested the employment of them in calculous afflictions.

549. Chrysosplenium oppositifolium, L. Damp shady places.

In a ditch by a small wood, Litchboro',—a locality given in Gerarde's Herbal.—I have never been able to find it.

(550. Chrysosplenium alternifolium, L. Is not recorded.)

551. Parnassia palustris, L. Grass of Parnassus. Marshy places. Very rare.

Foxhall bog (Lewin), Norton, near rill coming from Norton to Dodford (B), extinct; Wooton (Dr. Blunt), extinct, Nene a; Rothwell (M), Easton Maudit (Terry, 1837), Kettering (Gotch), Nene b; King's Cliffe (Berkeley), Still plentiful at Southorpe Marsh, Bedford Purlieus (Paley), Nene c; Dunslade (B), Avon; near Steane (Beesley), Cherwell.

One of our loveliest wild flowers, but becoming sadly rare in our County. It is still found, however, at Wittering, where its pure white waxy flowers are not uncommon in the marsh in August. Would it be a too impossible scheme to preserve that small piece of marsh, relic as it is of the old Flora of the County, when the cotton-grass waved its silky head over a great tract now covered with cornfields and pastures?

# ACCOUNT OF THE LATE BORING ON THE KETTERING ROAD, NORTHAMPTON.

By J. Eunson, C.E., F.G.S., F.M.S

The Water-Works Company finding it necessary to multiply their sources of supply to meet the demands of a rapidly increasing population, determined to sink a second well into the Middle Lias or Marlstone, from which strata the hitherto abundant and pure supply of water has been obtained. The site selected was a convenient and low-lying spot about one mile from the centre of the town, on the Kettering road, slightly above the river level, and immediately on the clay of the Upper Lias.

Operations were commenced in 1876, and a well 10 feet in diameter, sunk to a depth of 170 feet, passing into the Marlstone rocks, where it was anticipated a considerable supply of water would be met with; this proved not to be the case, the rock strata not presenting the same broken up and fissured condition found in those places in the Marlstone which yielded water, consequently headings were driven at this level a distance of 352 feet in a North-Western direction, and 141 feet to the North-East, but with no better result. The shaft was then carried down to a depth of 203 feet, passing through the Middle and into the Lower Lias clay, but with no better success. The result was disappointing, especially as within less than one mile from the spot the same strata was supplying hundreds of thousands of gallons daily. The cause of failure was evidently the closeness of the rock, which, although showing dampness and indications of water in places, no flow was obtained at any point. The Directors determined not to proceed further, and the well was for a time abandoned.

After careful consideration of all probable sources of supply in the neighbourhood, it was determined to obtain the best Geological opinions on the desirability of looking for a supply from a deeper source. Accordingly, Mr. R. Etheridge, F.R.S., President of the Geological Society, was asked to give the matter his attention, and after a careful survey of the neighbourhood and consultation with Mr. J. W. Judd, F.R.S., F.G.S., a report was presented to the Directors, in which they stated that there was every reason to believe that the Lower Lias clays might be passed through at 750 feet, and the New Red Sandstone beds probably met with at from 800 to 1,000 feet; and if the stratum known as the "Waterstones" could be tapped

an inexhaustable supply of pure water would be obtained; which might probably rise to within from 100 to 150 feet of the surface, and that on entering the beds of the New Red Sandstone, it was propable that salt or brackish water might be met with, but that by passing through these salt beds, pure water might be obtained.

These reports and opinions engaged the attention of the Directors for some time, and at last it was decided that it was the duty of the Company to attempt to obtain so desirable a supply.

Accordingly, a contract was entered into with Messrs. Docwra & Son, of London, a firm of high reputation as sinkers of deep wells and large borings. The arrangement was that such a system should be employed as would give accurate data of all strata passed through; that the depth should not exceed 1,200 feet from the surface; and the bore hole should be of such dimensions as in case of finding water the daily yield would be upwards of two million gallons.

Operations were commenced in April, 1879. From the bottom of the shaft before mentioned a smaller sinking of 5 feet in diameter was carried down to a depth of 400 feet; at this point boring was commenced. The apparatus employed was a Diamond Drill Machine, the invention of Mr. J. K. Gulland, C.E., who was associated with Messrs. Docwra & Son in the contract. The drill or 'crown' used for the first 150 feet was 22½ inches outside diameter, and 19½ inches inside, leaving a core or column of the strata passed through. The cores were extracted in lengths varying from 2 feet to 20 feet, these cores showing the actual strata passed through, particulars of which will be found carefully given further on.

In passing through clays or upper strata, it is necessary, after penetrating a certain depth, to put in a lining tube to prevent the sides which become disintigrated from the action of the air or water, from falling in and interfering with the operations. This had to be done three times in passing through the Clay, each time reducing the size of the bore hole, so that on entering the strata below the Lias the cores extracted were only 12 inches in diameter. As was expected, many difficulties and accidents to the machinery were encountered, some causing weeks of delay and anxiety. 95 working days were occupied in the actual operation of boring, 88 days in repairing damages, and altogether eight months in reaching a depth of 852 feet, or 649 feet from the bottom of the 10 feet well.

The machinery was driven by a 20-horse-power engine, working at times to upwards of 40 indicated horse-power.

Before reaching 852 feet, it was discovered that there was an inflow of water, but to what extent could not at the time be ascertained.

As will be seen from the section given, the Lias clays were passed through at 738 feet; this was very satisfactory on an estimate of 750 feet, and held out hopes of success, but following this the strata became unsatisfactory, first conglomerates, then sandstones and limestones presenting themselves in most irregular order. Specimens were duly submitted for investigation, but no definite opinion could be formed of the particular class of beds to which they belonged. At 807 feet an extremely hard quartzite rock was encountered, the nature of which was so unexpected that no opinion of the strata could be formed. After passing through 25 feet of this hard rock, the unmistakable carboniferous or Mountain limestone was found, followed by the clay beds of the same series. This was again disappointing and destroyed all hopes of obtaining water, the work of boring was therefore at once stopped, and preparations made to pump the bore hole to test the quantity and quality of the water which had been touched; accordingly pumps were fixed and water raised at the rate of 2,000 gallons per hour for 77 hours. The level of the water falling from 130 feet to 210 feet, at which level it remained during the pumping, thus showing that with 70 feet head of water the fissures or porous rock was able only to give out 2,000 gallons per hour. The quality was found to be such as was expected might be met with in the upper beds of the New Red Sandstone—brackish, and the temperature nearly 70 degrees. On making a rough analysis by evaporation, the water was found to contain upwards of 12 lbs. per 100 gallons of chloride of sodium, soda, magnesia, and lime, rendering it quite useless for domestic purposes; had there been any prospect of obtaining water from lower strata, this might easily have been stopped out, but from the complete absence of the New Red Sandstone, it was hopeless to search deeper.

In carrying out the arrangement for pumping, it was found that with a 20″ pumping main fixed in a 24″ bore pipe, there was no room for a float to indicate the level of the water at any given period; an arrangement was therefore made by which the level of the water in the pipe indicated itself on a pressure gauge fixed at the surface. A small soft metal pipe of $\frac{3}{8}$ of an inch in diameter was lowered between the pump barrel and the bore pipe to a known depth of 240 feet, open at the bottom, the top connected to a pressure gauge—a branch being attached to an air pump. Air was pumped into the pipe, forcing the water out at the bottom, the gauge indicating the pressure necessary; the indicated pressure thus giving the head of water between the bottom of the pipe (240 feet), and the surface of water in the bore pipe. By keeping the air pump at work during the time the pump was working, the exact level of the water at each moment was indicated with the greatest accuracy.

The depths of the various changes of strata is given on the section.

Water level when the boring was stopped 130 feet.

Bottom of the 10 feet well 203 feet.

Bottom of the 5 feet well and the beginning of the bore hole 403 feet.

Commencing from the surface, the stratification is as follows :—

| Ft. | In. | | |
|---|---|---|---|
| 18 | 0 | ... | Surface Soil marl and clay |
| 150 | 6 | ... | Upper lias blue clay |
| 154 | 6 | ... | Alternate hard green rock and clay stones |
| 155 | 6 | ... | |
| 161 | 6 | ... | |
| 163 | 6 | ... | |
| 171 | 0 | ... | |
| 173 | 6 | ... | |
| 177 | 0 | ... | Laminated clay |
| 185 | 0 | ... | Clay bands with joints |
| 187 | 6 | ... | Hard gray rock |
| 191 | 0 | ... | Hard clay |
| 192 | 6 | ... | Light coloured rock |
| 203 | 0 | ... | Lower lias clay |

The above particulars were given by the miners who sunk the first shaft.

The following were taken during the progress of the work by H. J. Eunson, in charge of the operations :—

| | | | |
|---|---|---|---|
| 213 | 0 | ... | Lower lias clay |
| 213 | 9 | ... | Argillacious rock |
| 222 | 0 | ... | Blue clay |
| 223 | 0 | ... | Light argillacious rock |
| 231 | 6 | ... | Blue clay |
| 232 | 0 | ... | Thin band of light coloured rock |
| 265 | 6 | ... | Blue clay |
| 265 | 8 | ... | Bed of microscopic shells |
| 269 | 6 | ... | Blue clay |
| 270 | 6 | ... | Light rock 4″, clay 6″, shell bed 2″ |
| 274 | 6 | ... | Blue clay |
| 274 | 8 | ... | Shell bed |
| 292 | 6 | ... | Blue clay |
| 292 | 8 | ... | Shell bed |
| 318 | 0 | ... | Clay |

| Ft. | In. | | |
|---|---|---|---|
| 322 | 0 | ... | Hard light rock 2″, limestone 1′–6″ |
| 332 | 6 | ... | Blue clay |
| 337 | 8 | ... | Limestone 10″, clay 3′–0″, Limestone 1′–4″ |
| 421 | 0 | ... | Alternate beds of blue clay and rock. |
| 439 | 0 | ... | |
| 488 | 0 | ... | |
| 389 | 0 | ... | |
| 572 | 6 | ... | |
| 573 | 0 | ... | |
| 616 | 6 | ... | |
| 617 | 0 | ... | |
| 661 | 6 | ... | |
| 661 | 10 | ... | |
| 678 | 0 | ... | |
| 678 | 6 | ... | |
| 709 | 6 | ... | |
| 711 | 0 | ... | Limestone |
| 720 | 0 | ... | Blue clay |
| 729 | 0 | ... | 3″ rock, then blue clay |
| 731 | 0 | ... | Limestone rock |
| 735 | 0 | ... | Blue clay |
| 736 | 0 | ... | Hard rock |
| 738 | 0 | ... | Blue clay |

| | Ft. | In. | | |
|---|---|---|---|---|
| C | ...750 | 6 | ... | Calcareous conglomerate—very hard |
| D | ...759 | 0 | ... | Hard conglomerate with light coloured sandstone |
| E | ...765 | 0 | ... | Magnesian limestone |
| F | ...773 | 0 | ... | Light green fine grained sandstone with hard and soft nodules |
| G | ...778 | 0 | ... | Similar to F, but more even in grain |
| H | ...787 | 0 | ... | Very hard light coloured sandstone |
| I | ...787 | 6 | ... | Hard green clayey sandstone |
| J | ...788 | 6 | ... | Hard light coloured sandstone similar to H |
| K | ...791 | 6 | ... | Clay rock |
| L | ...795 | 0 | ... | Coarse grained gray sandstone |
| M | ...798 | 0 | ... | Light brown coarse sandstone |
| N | ...801 | 0 | ... | Light argillaceous rocks |
| O | ...803 | 6 | ... | Fine variegated conglomerate |
| P | ...805 | 6 | ... | Brown sandstone fine grained with sulphate of lime |

| | Ft. | In. | | |
|---|---|---|---|---|
| Q | 807 | 6 | ... | Very hard Quartzite rock, varying in colour from Q to T—so hard, that at this depth nothing but the Diamond drill could have penetrated it. |
| R | 808 | 6 | ... | |
| S | 809 | 0 | ... | |
| T | 830 | 6 | ... | |
| U | 833 | 0 | ... | Hard fine grained yellow sandstone |
| V | 834 | 0 | ... | Red Mountain limestone |
| W | 836 | 0 | ... | Yellow with fossils |
| X | 836 | 6 | ... | Hard fine grained sandstone with crystals of calc spar |
| Y | 844 | 0 | ... | Similar to U |
| Z | 848 | 0 | ... | Variegated red and yellow argillaceous shale with plant beds, lower carboniferous. Three feet more was bored in soft shale but the core was not extracted. |

SUMMARY.

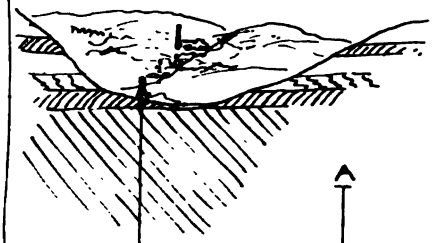
| | Ft. | In. |
|---|---|---|
| Lias Clays and rock ... ... | 738 | 0 |
| Abnormal Sandstones and conglomerates ... ... | 67 | 6 |
| Quartzite rock ... ... ... | 25 | 0 |
| Lower Carboniferous rocks ... | 17 | 6 |
| | 848 | 0 |

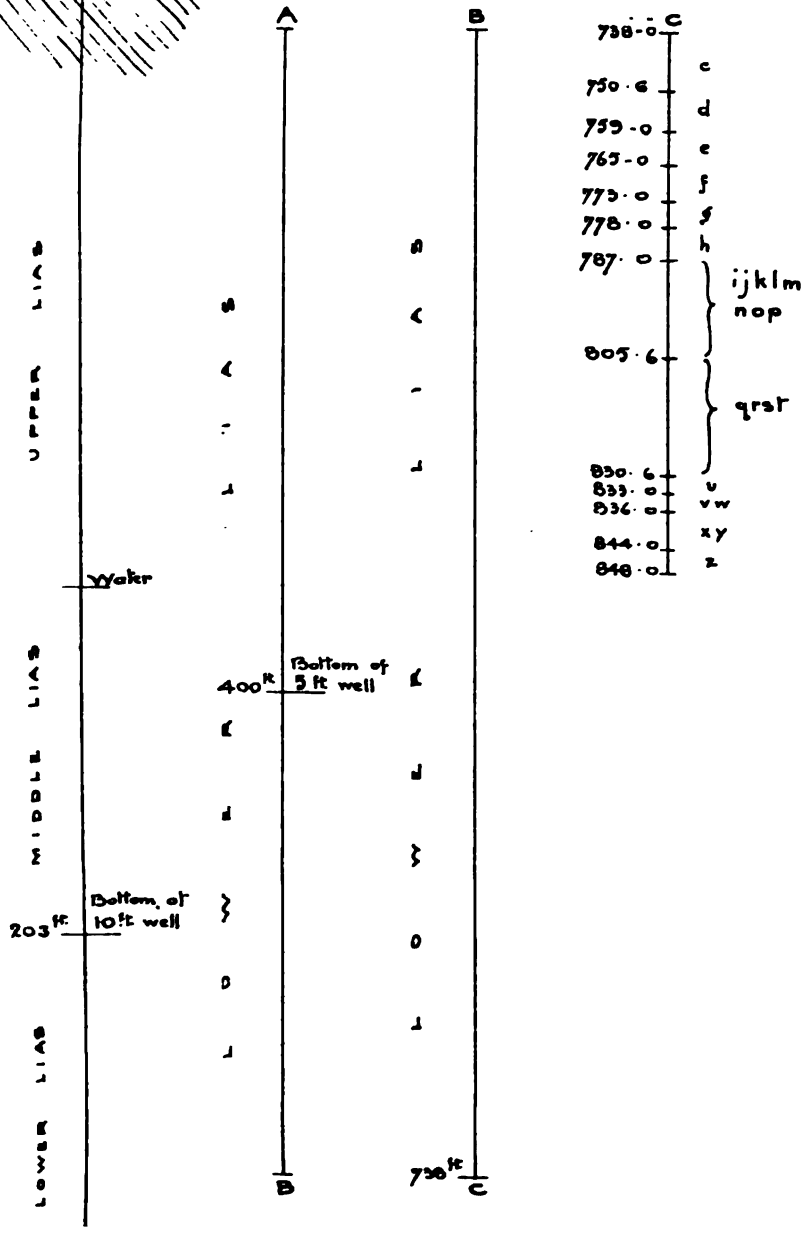
The results, after passing through the Lias clays were altogether unexpected, the whole of the trias and New Red Sandstone and Upper Carboniferous series were wanting, being represented by the 67.6 of abnormal sandstones and conglomerates; the Mountain limestone and clays of the Lower Carboniferous series have a dip of about 15 degrees, but in what direction was not ascertained, nor could it be with any reliance decided whether the limestone is part of a cone or extended plain.

The unexpected discovery of primary strata so near the surface, opens up a wide field for investigation and research in the underground Geology of this neighbourhood. So far as at present known the Lower Carboniferous rocks are in an abnormal position at this spot, forming probably the apex of a cone, or ridge, standing through the Upper Coal Measures and New Red Sandstone. If this be the case, it is not beyond the range of probability that the much desired coal deposits may be near at hand; but as this paper is intended only as a record of the facts relating to this particular boring, speculative deductions must be left for some future occasion.

Should another deep bore be put down in the neighbourhood, it will, in comparing the results with the above data, give important and valuable information.

# Boring at the Kettering Road, Northampton, 1879-80.





The following is a list of the fossils found, with their respective depths :—

FOSSILS.—*Brachipoda.*

Rhynchonella, Terebratula } Upper beds of the Lower lias

*Conchifera.*

| | Feet from Surface. |
|---|---|
| Avicula cygnipes ... ... ... | 216 |
| Gryphaea incurva ... ... ... | |
| Ostrea ... ... ... ... ... | 220 |
| Pecten liassinus ... ... ... | 209 |
| Pecten equivalvis ... ... ... | |
| Pecten inequivalvis ... ... ... | |
| Hippopodium ponderosum ... ... | 320 |
| Lima ... ... ... ... ... | 400 |
| Modiola Scalprum ... ... ... | 280 300 |

*Gasteropoda.*

Pholadomya ... ... ... ...
Pleurotomaria ... ... ...

*Cephalopoda.*

| | | |
|---|---|---|
| Belemnites tubularis | ... ... | 212 |
| ,, and phragmacones | ... | 210 |
| Ammonites. Brivis spina ... | ... | 225 |
| ,, Capricornus ... | ... | 255 |
| ,, Fimbriatus ... | ... | 270 |
| ,, Heterophyllus | ... | 255 |
| ,, Margaritatus | ... | 255 |
| ,, Obtusis ... | ... | 218 |
| ,, Planicostatus | ... | |
| ,, Raricostatus ... | ... | |
| ,, Valdami ... | ... | 217 |

*Echinodermata.*

Extracrinus Briarius ... ... 250′ 270′ 220′
Ophiura ... ... ... ...

(ADDITIONAL FOSSILS, etc.)

| | |
|---|---|
| Cardium truncatum ... ... ... | 220 |
| Unicardium ... ... ... ... | 213 |

| | Feet from Surface. |
|---|---|
| Astarte... ... ... ... ... | 211 |
| Arca ... ... ... ... ... | 211 |
| Pinna ... ... ... ... ... | 210 |
| Miacytes ... ... ... ... | 270 |
| Goniomya ... ... ... ... | 220 225 |
| Leda ... ... ... ... ... | |
| Coprolite ... ... ... ... | 250 |
| Lignite... ... ... ... ... | 420 270 |
| Pyrites (in several conditions) ... | |
| Claystones ... ... ... ... | 440 |
| Fossils very scarce between ... | 225′—250′<br>320′—400′<br>700′—738 |

LOWER CARBONIFEROUS FOSSILS.

Lithostrotion junceum.
Lonsdaleia floriformis.

[*As an addendum to the above account of the underground Geology of Northampton, the following extract from the "Standard" of January 24th, 1882, will be read with interest.—Eds.*]

IS THERE COAL UNDER LONDON?

Professor J. W. Judd delivered an interesting lecture at the London Institution last night on the question whether there is coal under London. Without following the learned Professor in his demonstration of the means by which scientific geologists are able to say with certainty where it is useless to seek for coal, and where it is highly probable that if sought for, deep enough, the coal measures may be found, we may premise that the verdict of geologists is that a coal deposit, in all probability, does exist beneath London, and that, moreover, the expenditure of a few thousands of pounds would, in a very short time, settle that important question for good and all. The foundation for this belief is the fact, pointed out so far back as 1828 by Dr. Buckland and Mr. Conybear, that the Bristol coal-field is geologically identical with that of Eastern Belgium and Westphalia. From this is was deduced that a palæozoic ridge, very much flexed and contorted, connected the two districts for a distance from where it has been traced from St. David's Head in Wales to Westphalia of 630 miles. Sir H. De La Beche was of opinion that this continuity existed beneath the English oolite and cretaceous deposits along this line, and the reasoning of Mr. Godwin Austin in 1855 on this point may be said to have carried all geologists with him in the affirmative. In 1866 Professor Prestwich re-examined the evidence, and fully confirmed the views of Mr. Godwin Austin. For 250 miles at the continental end of this axial line the coal measures have been proved to exist by actually working the coal, or by demonstrating their continuity beneath the younger strata under which they dip, by means of boring. In this way they have been traced to the shores of the Channel and North Sea, from Boulogne to Ostend. At the Bristol end, they had been traced from St. David's Head to the Mendip Hills, beneath which they dip, very early in the history of English geology. Since then the Bristol coal-field has been traced by a boring six miles beyond the most easterly working. There remains, therefore, some 150 miles of this axial line unexplored; but subsequent borings

show that this ridge of old rock is not at any very great depth from the surface under London, and that its accompanying coal measures may therefore be within a practicable distance for profitable working. Wells sunk at Oxford give the depth of the oolite and lias as only 420 feet. Another at Burford, in the same county, struck the coal measures at 1184 feet. One at Northampton at 830 feet. The Diamond rock-boring apparatus, which brings up solid cores of rock full of their characteristic fossils, leaves no doubt in the minds of geologists as to when the coal measures are really reached in such borings as these. In 1872 the British Association made an attempt to solve this interesting question by a boring at Battle, in Sussex. They chose this point, so far south of London, to avoid the great depth of chalk that underlies London, but it is supposed they got off the flank of the ridge of palæozoic rock, of which they were in search, for after going to a depth of 1800 feet, they were still in the newer beds of the Oxford clay formation. Two wells sunk in London before that date—one at Kentish Town, 1114 feet deep, and the other at Meux's Brewery, Tottenham-court-road, 1066 feet deep—left little doubt in the minds of geologists that the palæozoic ridge had been reached, but the old method of boring had been employed, which smashed up the core and its included fossils, and, therefore, they could not be sure whether the material was the old or the new red sandstone. More recently two wells have been sunk by the New River Company, one 940 feet deep, near Cheshunt, and the other 796 feet deep, near Ware. In both these cases the Diamond Rock-boring process was employed, and solid cores were brought up from those depths; the contained fossils proving the rocks to be of the Devonian and the Upper Silurian beds. The continuity of this predicted ridge of old rock, therefore, has been established beyond doubt, and that it includes useful coal deposits in the 150 miles hitherto unexplored seems in the highest degree probable. To settle this point all that is needed is that a few comparatively inexpensive borings should be carried out along the axial line. Croydon, some point on the North Downs, Maidstone, and Folkestone, have been suggested by geologists, and, seeing that Londoners pay five millions sterling annually for the carriage of their fuel alone, the economical advantage of finding coal beneath their own feet is so great that it is difficult to suppose that so important a problem can long remain unsolved.

THE WALNUT TREE AT FILTON.

*Printed by the Woodbury Permanent Printing Company, from a Negative by Mr. H. G. Striven.*

# TREES OF NORTHAMPTONSHIRE.

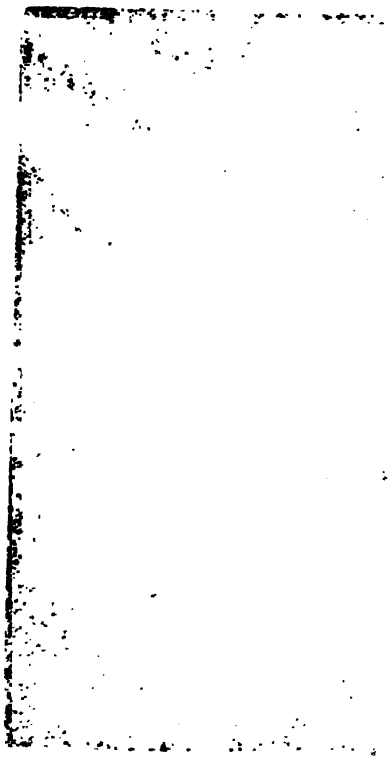
## THE WANSFORD TREES.

The little village of Pilton is about two miles from Peterboro', Thorpe on the Northampton and Peterboro' Railway, and just across Lilford Park. The Church and Vicarage which are close by, and some little distance from the house of the Vicar, form a fine feature from Lilford, even through a vista of foliage, and will be remembered by those of our Members who were fortunate enough to have been present on one of those occasions, when the Society visited the hospitality of our noble President.

The house, which is now the Vicarage of Pilton, is the estate as it was at the last residence, in the county, of the once powerful family of Tresham. The following notes respecting it are taken from an interesting paragraph on the Ruins of Lyveden, and the Family of Tresham, by J. C. Bell, kindly lent to me by the Rev. P. G. Hewson, the present Vicar of Pilton. The first notice occurs in the thirty-first year of Henry VIII., when John Tresham, Esq., died seized of it and was succeeded by Maurice Tresham, his son and heir, by Dorothy daughter of Maurice Osbaston, of Hallaton, a manor, eight years of age. This gentleman married Margaret, daughter of Frances Tattefield, Esq., by whom he left issue, Sir Thomas Tresham, of Newton, Knight, William and Maurice, and several daughters. By Anne, daughter of Bartholomew Tate, of De la Pre, Sir Thomas Tresham had three sons—Henry, who died without issue in 1605; and Thomas, and William who had the lordship of Newton after the decease of his eldest brother, and four daughters—Elizabeth, Alice, Rose, and Mary married to John Crane, clerk of the Kitchen to James I.

The last of this family who enjoyed it was George Tresham, Esq., of whose relict it was purchased by Sir Thomas Powys, Knight, in 1715. On his decease, in 1719, it came to Thomas Powys, Esq., his son, who, dying but a year afterwards, left it to his son, Thomas Powys, a minor, the first Lord Lilford, from whom it has descended to his grandson, the present Lord Lilford.

In the South porch of the Church are two shields, for Tresham, three eagles, and a saltire. In the Churchyard are several ancient tombstones, and in the ground, for persons who formerly resided at Lyveden.



# TREES OF NORTHAMPTONSHIRE. X.

## The Walnut Trees at Pilton.

The little village of Pilton is about two-and-a-half miles from Thorpe Station on the Northampton and Peterborough Railway, and just across the river from Lilford Hall. The Church and the Vicarage which are close together, and some little distance from the few houses of the village, form a charming picture from Lilford, seen through a vista of foliage, and will doubtless be remembered by those of our Members who were fortunate enough to have been present on one of those occasions, when the Society has enjoyed the hospitality of our noble President.

The house, which is now the Vicarage of Pilton, is interesting as having been the last residence, in this county, of the once powerful family of Tresham. The following notes respecting it are taken from an interesting monograph on the Ruins of Lyveden, and the Family of Tresham, by Mr. T. Bell, kindly lent to me by the Rev. F. G. Hodgson, the present vicar of Pilton. The first notice of it is in the thirtieth year of Henry VIII., when John Tresham. Esq., died siezed of it, and was succeeded by Maurice Tresham, his son and heir, by Dorothy, daughter of Maurice Osborne, of Kelmarsh, a minor, eight years of age. This gentleman married Margaret, daughter of Francis Tanfield, Esq., by whom he left issue, Sir Thomas Tresham, of Newton, Knight,—William and Maurice, and several daughters. By Anne, daughter of Bartholomew Tate, of De la Prè, Sir Thomas Tresham had three sons—Henry, who died without issue in 1618; and Thomas, and William who had the lordship of Newton after the decease of his eldest brother, and four daughters—Elizabeth, Alice, Rose, and Mary married to John Crane, clerk of the Kitchen to James I.

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In the South porch of the Church are two shields, for Tresham, three trefoils, and a saltire. In the Churchyard are several ancient tombstones, sunk in the ground, for persons who formerly resided at Lyveden.

The manor house, which is now the vicarage, was for some time used as a farm house. It has a very fine oak staircase, similar to the one at the old manor house at Lyveden, and the drawing-room on the first floor is wainscoted with oak, and has an oak chimney piece of good design.

The walnut tree, which is the subject of our illustration, stands in the field near the vicarage garden. It is most likely that the grounds attached to the manor house extended some distance further in this direction, as the turf shews signs of old enclosures. It is probably coeval with the house, and may have been planted by the Treshams. It is still a very fine tree, though it has has been broken a good deal by storms, especially by the great storm of October, 1881, which did so much damage to the trees of this county. It measures 18 feet 11 inches in girth, at 3 feet from the ground, which is the smallest part of the trunk, and 20 feet 5 inches at 5 feet. It is about 70 feet in height, and the greatest lateral spread of its branches is 90 feet.

There is another fine walnut tree standing in the same field, about half way between the church and the village. This is not so old a tree as the other, but promises to equal it in size. It has now a larger head but a smaller girth, measuring 15 feet 11 inches at 5 feet from the ground, while its branches stretch over 105 feet from east to west, which is its greatest diameter.

The photograph was taken on the 31st March, 1882.

We are sorry to have to record the loss of the willow tree at Fawsley, illustrated in our last number. A violent gust of wind caught the head of it, on the 25th of February last, and broke it entirely off from the stem. It had withstood the gale of October last without damage.

The old Oak at Lowick, which was described in our 8th number, has had a very narrow escape from what might have been total destruction. We learn from a paragraph in the *Northampton Herald* of April 22, that the tree has been on fire, which is supposed to have originated from some sparks having been driven by the wind into the hollow interior from a fire lighted near by some labourers to burn hedge trimmings. Fortunately however, prompt measures were taken, the fire engine being brought from Drayton Park, and the fire was put out without doing serious injury. the only result being the burning of a large hole in the side of the trunk, in which, as was stated in our former description, a narrow opening already existed.

R. G. S.

# NOTES ON THE BIRDS OF NORTHAMPTONSHIRE.

By Lord Lilford, F.L.S., F.Z.S.

62. Pied Wagtail. *Motacilla yarrellii.*

This species, better known to our country-people as "Dish-washer," is very common with us from February to the end of September, when its numbers very sensibly decrease; and in the frequent event of a severe frost very few, if any, of these pretty birds remain in our neighbourhood, though now and then a Wagtail or two may be found, even in the hardest weather, attending the sheep which are at that season penned upon our turnip-lands. In the summer months it would be difficult to say where the Pied Wagtails may not be met with in this county: our meadows, lawns, grass-plots, and road-sides are alive with them, but they avoid woods, and generally prefer somewhat moist grounds and the neighbourhood of waters; they may be seen, however, in almost any field in which horses, cattle, or sheep are pastured, dodging about amongst the legs of these animals in pursuit of insects. The nest of this species is often chosen by the Cuckoo, whose egg generally resembles those of the Pied Wagtail perhaps more than those of any other of our common insectivorous birds. At Lilford we almost every year have one of these intruders reared by a pair of Wagtails in the flower garden; and it is amusing, though somewhat pitiful, to watch the trouble and anxiety of the deluded foster-parents to feed and protect their ungainly and ravenous ward after it has left the nest. In one case the Wagtail's nest was built in ivy, on the garden-wall, within a few feet of several trained Falcons on their blocks, and the young Cuckoo, on its first sally from the nest in trying to reach a stone balustrade, fell within a few inches of the former birds, which fortunately, was at that moment hooded; the distress of the old Wagtails was really painful to see, though they themselves would constantly run amongst the Falcons, whether hooded or not; they evidently were in the greatest terror for the safety of their treasure, which sat chirping and gaping for food, whilst the Wagtails fluttered over it, settled close to it, darted at the Falcon, and almost screamed in their agony of anxiety. I caught the Cuckoo and placed it on the balustrade, where it was fed almost incessantly for upwards of an hour by its guardians, one or other of which, however, was never out of sight of the voracious fledgling. A very favourite spot for the Pied Wagtail is a ford or shallow whereat cattle come to drink and bathe; in such places this species may often be seen wading in

the water, snapping at the insects which hover around, or searching the bottom for minute larvæ; it has been observed also to take minnows from a fountain. This bird generally selects a hole in the side or at the top of a wall, especially when overgrown with ivy, for a nesting-place; but I have known many instances in which it has been placed on the ground, in thatch, rockwork, the top of a water-pipe, a faggott-stack, and once or twice in a large flower-vase in our garden; I once only found a nest of this bird in a bush, and believe that such instances are very uncommon. The materials used for the nest are moss, grass-stalks, and fine roots, with a lining of hair; the eggs are from four to six, white, with a close sprinkling of grey. It is remarkable that a bird so common as the Pied Wagtail is in our islands should be comparatively rare on the continent of Europe, where its place is taken by a very closely resembling species or race, the White Wagtail (*Motacilla alba*), which has been often met with in England, but not, as far as I know, in Northamptonshire, though I find it recorded as having occurred several times in Lincolnshire, and been found nesting as near to our borders as Whittlesea. The two species are easily distinguishable in adult summer plumage, but in winter an immature plumage may easily be confounded.

63. GREY WAGTAIL. *Motacilla sulphurea.*

This extremely pretty bird is by no means abundant with us, but may, nevertheless, be met with in pairs in the winter in certain spots year after year. We generally find it frequenting shallow gravelly bends of the river or brooks, over which the water runs swiftly, and which consequently remain longer unfrozen than the more tranquil reaches of our streams. A pair often select the neighbourhood of our boathouse at Lilford in severe weather, and make frequent visits to the old stonework of the house. I think I may say that I never saw one of these birds perch upon a tree or bush. The favourite haunts of this Wagtail in our islands are the wilder portions of our western and northern counties, where it may be met with, in company of the Dipper, frequenting rapid rocky streams, about which it is constantly flitting from stone to stone, or running over the pebbly banks in pursuit of its insect food: on such streams an old watermill is almost a certain find for a pair of these birds in the nesting season: and in holes in the walls of such buildings or their appurtenances I have found their nests in Devonshire, North and South Wales, Derbyshire, various parts of Ireland and Scotland, Spain and Switzerland. In the eastern and midland counties of England this Wagtail is seldom seen in the summer months, and is not, as far I know, numerous in winter—in fact, I do not recollect ever to have

seen more than half a dozen of these birds together in any part of England. The note of the Grey Wagtail is of the same character as that of the species last described, but sharper and clearer in sound; I am not aware that the male bird has any true song. I have not examined the stomachs of any of this species; but their principal food evidently consists of insects, varied, according to Yarrell, by small freshwater mollusks. The nest, usually placed in a hole of a wall or in a stony bank, much resembles that of the Pied Wagtail, but is considerably smaller. The eggs are usually five in number, of a creamy white, closely blotched or clouded with pale yellowish brown, and may be distinguished from those of the commoner Yellow Wagtail (*Motacilla rayi*) by their larger size and the absence of the hair-like dark streaks which in most cases are found on the eggs of the latter bird. I do not recollect to have seen the Grey Wagtail in Northamptonshire earlier than the middle of November or later than the end of March. I may mention that our country-people confuse this species with the Yellow Wagtail, and generally call the young Pied Wagtail "*Grey* Dish-washer."

64. YELLOW WAGTAIL. *Motacilla rayi.*

This bird, which is a very common summer visitor to many parts of England, cannot be called abundant in our neighbourhood; it arrives in small numbers about the beginning of April, and from that time to the middle or latter end of September a pair may be found here and there, generally haunting a rough fallow-field or badly-drained pasture-land. This species is much more arboreal in its habits than the two birds last described, and may often be seen perched on a low bush or fence. The nest is built on the ground, of dried grass-stalks and fine roots with a lining of hair, and is generally placed in a tuft of grass, or in a slight depression well concealed by summer plants. The eggs are generally five, sometimes six, in number, and much resemble those of the last species except in the particulars already mentioned. About the middle of September we generally notice small parties of these birds in our meadows and pastures, evidently bound on their southward migration; they are exceedingly local birds, and their appearance may safely be reckoned upon, year after year, in the same localities at the same date. The Yellow Wagtail has more of a song and altogether more musical notes than either the Pied or Grey species. Yarrell states that this bird is generally rare in Ireland; but we found it in some numbers and breeding on the shores of Lough Corrib, co. Galway, in the summer of 1854.

65. TREE-PIPIT. *Anthus arboreus.*

This bird, which is, I think, generally known in Northamptonshire as "Titlark," is a tolerably common spring visitor to our district, though not by any means so abundant there as in many parts of England. It arrives with us generally in the second or third week of April; and the male bird soon makes his presence known by his loud song, which has some resemblance to both that of the Canary and the Sky-Lark; he also attracts attention by his common habit of soaring from a tree to a moderate height, and descending slowly, singing his best, with tail outspread and legs hanging, to the perch from which he started, or another close by it, without coming to the ground: this habit has, in some places, gained him the name of "Wood-Lark;" but I need hardly say that the true Wood-Lark (*Alauda arborea*) is a very distinct bird, which differs from the present species in many essential particulars, and whose song is in every way far superior to that of the Tree-Pipit. This bird is very active on the ground, and runs swiftly and lightly, in the manner of a Wagtail, in pursuit of insects, which, with rare exceptions, seem to be its only food. In common with a great many of our spring-visitors, this Pipit is a very local bird, generally to be found at or about the same spot year after year. There is on the lawn at Lilford a certain oak tree, standing alone, not far from the river, in or about which tree I have never failed to find a pair of these birds for as far back as I can remember, and within a few yards of which I have often found their nest placed on the ground amongst tall grass, and built of moss and dry grass-stalks, with a lining of dark hairs. The eggs are generally five in number, and vary very much in different nests, though all the varieties possess a certain indescribable character, which, to a practised birds'-nester, would, I think, prevent their being mistaken for those of any other British bird. In the case of the nest or nests above-mentioned, I have generally found eggs of a white ground-colour, which is nearly hidden by broad streaks and blotches of very dark brown, in others pink is the predominant colour; but I cannot do better than refer my readers to the fourth edition of Yarrell's 'British Birds,' vol. i. p. 572, for a clear description of the "three or four groups," into which a series of the eggs of this bird may be divided. The Tree-Pipit, besides singing on his aerial excursions, as above described, often sings from his perch; and though his actual strain of melody is not very prolonged, it is as often repeated as that of any singing bird with which I am acquainted. This species may be met with in small, probably family, parties about the end of August, and leaves us early in September. The nest of this bird is often used by the Cuckoo; but we have only met with two such cases in Northamptonshire.

66. MEADOW-PIPIT. *Anthus pratensis.*

This species, commonly known as Titlark in those parts of England in which it breeds, is, in our neighbourhood, an autumnal visitor, and not very abundant at any time, no doubt from the lack of the open wastes and commons in which it chiefly delights. I cannot positively say that it does not breed with us; but I certainly never found a nest in my boyish birds'-nesting rambles in our district, nor do I recollect to have met with the bird in the summer months. About the middle of September the Meadow-Pipit appears in small numbers in our pastures and meadows, and may generally be found throughout the winter by the side of the river or its tributary brooks; the greatest numbers I have met with have always been in these localities in the month of March, but their stay is then very short. Although with us, and in other parts of England, this bird is migratory, in many places it remains the whole year, only shifting its quarters, according to weather and "questions of supply," from one spot to another. In many of the upland-moor districts of our islands the Meadow-Pipit is decidedly the most common of small birds, and is found, more or less abundantly, in suitable localities from the Lands End to Shetland; it is also exceedingly common in Ireland. Though in many habits it resembles the Tree-Pipit, this bird is seldom seen to perch on a tree; its notes are much softer, and its favourite nesting-haunts very different from those of that species, besides which the Meadow-Pipit is not so exclusively insectivorous, and often varies its diet with various seeds. The only bird of this species which I ever kept in captivity lived for upwards of a year almost entirely on canary-seed, with now and then a few ant's eggs. We have found the abundance of this little bird in a wild district of Inverness-shire a great hindrance in deer-stalking, as it would rise close to us as we were creeping up to a stag, and going off with a jerky flight and cry of alarm, put all the hinds at once on the alert. The nest of the Meadow-Pipit resembles the inner part of that of the last species, but this bird seldom makes use of moss. The eggs are five or six in number, and vary a good deal in colour, though not so much as those of the Tree-Pipit; the most common type is of a yellowish-white ground, closely spotted and blotched with greyish brown. The nest, in every instance that I have met with, has been placed on the ground, in a tuft of grass or heather or closely cropped furze, always far away from any thing worthy of the name of a wood, and seldom even very near to any high trees. On the moorlands and open commons, the nests of this bird are the favourite nurseries of the Cuckoo, and in those localities one or more Meadow-Pipits may constantly be seen in pursuit of an intruder of that species, against which they seem to display a special animosity.

67. SKY-LARK. *Alauda arvensis.*

A detailed account of this well-known bird, its song and habits, would, I think, be entirely unnecessary here, as there is probably no one of my readers who is not already acquainted with them. I find that with us the numbers of this bird are, and for some years past have been, perceptibly decreasing; and though in the winter months, especially after the break up of a long and severe frost, vast flocks may be still occasionally met with on our arable lands, I think that I may safely say that on our freshly-cut stubbles in September not a tenth part of the Sky-Larks which used to frequent them twenty years ago are now to be met with. There is no doubt that this species and many others suffered severely some years ago from the abominable practice of scattering poison amongst the newly-sown wheat, but not to a sufficient extent to account, at all events in our district, for the steady and permanent annual decrease above mentioned. It is true that enormous quantities of Sky-Larks are netted every year in this country and on the continent, but this has been the case for many more years than we can recollect; no natural causes, as far as I am aware, have conduced to this diminution, and the Sky-Lark is certainly not a species which is injuriously affected by the improvements in agriculture, draining, enclosures, and the like, so that I confess myself at a loss to assign any probable cause for this very certain fact. I am not by any means forgetful of the damage done to all ground-breeding birds by mowing machines and similar implements; but as the majority of our Sky-Larks certainly nest on the arable land, and their young can generally take care of themselves by the time of corn-harvest, they are not so much affected by these inventions as are our game-birds, which are more addicted to nesting in grass-fields and meadows, and are cut to pieces and mangled by dozens, from the want of a little care in the management of these, to the sportsman, infernal machines.

The Sky-Lark may be correctly termed migratory in our islands, for although great numbers nest in most parts of Great Britain and Ireland, a very large portion of our home-bred birds leave us in the autumn, and our shores are annually visited at that season by flocks of foreigners, whose stay depends on the weather. In our own district I have often noticed streams of Sky-Larks passing over at a moderate height, and in almost complete silence, towards the end of November; these birds seem seldom to alight, and I have generally observed that their appearance in this manner is an infallible sign of severe weather. Vast numbers of this species are caught by dragging the stubble at night with nets and in many other ways, and many are also shot by the aid of Lark-glasses, the glittering of pieces of looking-glass in the sun seeming to possess a fatal fascination for these

birds whilst migrating, though I have in vain tried to attract our resident birds in that manner. These birds are most excellent food when fat, and meet with a ready sale in all parts of Europe.

In all parts of the Mediterranean shores, especially in Italy and Sicily, the autumnal migration of the Sky-Lark is looked forward to with immense anxiety, and tens of thousands are annually shot and caught in those countries. We happened, in the beginning of November, 1856, to be sailing from Cagliari to Palermo, against fresh southerly breezes, and during the voyage, which occupied the best part of three days, we were constantly surrounded by myriads of tired Sky-Larks, many of which came on board. On our arrival at our port, we found the greater part of the male population up in arms, not, as usual, against the government, but for the slaughter of these poor birds, which were dropping about, worn out by their journey, not only along the sea-beach, but on the quays, wharves, public gardens, and even in the streets of the town; many were caught by hand or knocked over by sticks and stones, but along the "Marina," or marine promenade, a constant discharge of small arms was kept up from daylight to dark during the few days of our stay.

The Sky-Lark is much given to dusting itself, but, contrary to the habits of most birds which indulge in that luxury, is also fond of bathing. This bird, as is well known, will live and sing for many years in captivity if properly cared for, and has been known even to breed in confinement.

The Sky-Lark affords very good sport to the falconer, the Merlin being the bird selected for this pursuit; but the best trained of these little Falcons rarely manage to take an adult Lark in full feather, though they will easily master young or moulting birds, in August and the early part of September. I have alluded, when treating of the Hobby, to the ancient manner of taking Larks with the aid of that species. Curious stories are related of the removal by Sky-Larks of their eggs and young from exposed and dangerous sites, or when their nests have been interfered with; and Yarrell quotes an instance in which the parent birds built a dome of grass over a nest containing young, which had been laid bare by the scythe. The principal food of the Sky-Lark appears to be seeds of various kinds, varied with small worms and insects, and in the winter it is fond of young corn, turnip-tops, and, in fact, almost any green food that it can find.

68. WOOD-LARK. *Alauda arborea.*

This bird is by no means common in our neighbourhood, or, indeed, in any part of Northamptonshire with which I am acquainted; and although

I have met with it in the county, I could never make sure of finding it at any particular spot, or any special season of the year. I hold the song of the Wood-Lark as second only to that of the Nightingale amongst our British birds, and a very close second; indeed there is less variety of excellence in the musical powers of the former than those of the latter; we never heard a song of a wild Wood-Lark that was not perfect melody, whilst we have listened to many Nightingales whose strains were unworthy of their name. The Wood-Lark in plumage much resembles the Sky-Lark, but it is a smaller bird, with a comparatively short tail, and may always be distinguished by the light-coloured streak over the eye; its habits also are very different from those of the latter bird, as, with few exceptions, it is found in the neighbourhood of trees, and, as I have observed, is very fond of small clearings in thick woods or plantations; but it is a species of which I have seen very little in this country, and of whose habits I have seen most in Central Spain. In England it appears to be a partial and irregular migrant, leaving its breeding quarters in winter, to appear at that season in districts where it is comparatively unknown in summer, and *vice versâ*; but this habit is not without exceptions, as it seems that in some localities the Wood-Lark is a permanent resident. This bird soars and sings on the wing in the same manner as the Sky-Lark, but may also often be heard in full song from its perch on a high tree. It is said to sing at night in the summer months; but we have listened in vain for its music after dark, though its vocal powers seem to be at their best in the "gloaming," when few birds but Owls and Nightingales are to be heard. In Spain we have generally met with the Wood-Lark in early spring, frequenting dry localities amongst the woods of cork and evergreen oaks, in spots where the undergrowth of heath, cistus, etc., is low, and the ground comparatively bare; at that season it is found in small parties of from six to ten, which, on being approached, fly off with a soft musical call and wavering flight, to alight again at a short distance, some on the ground and others in the neighbouring trees; on the second alarm they generally make off together over the trees to a distance. I have never met with the Wood-Lark in what could be called open country. On the ground this bird is very active, running swiftly in every direction in pursuit of the small insects which seem to constitute its principal food; on catching sight of a human looker on, the Wood-Lark will often squat close to the ground, especially if its eye has caught that of the observer's, and in such cases will allow of a very close approach. I note that the editor of the fourth edition of Yarrell's 'British Birds' states that the first eggs of this species are often laid by the middle of March in this country; but I think I may safely say that in Central Spain the Wood-Lark has rarely paired at that season. The very few nests

I have met with contained fresh eggs about the beginning of May; these, of course, may have belonged to a second clutch; but I do not think that can have been the case, as I had noticed the birds in small flocks, as above mentioned, as late as the second week in April. I may, however, mention that these nests were in a district at least two thousand feet above the level of the sea. In one instance I discovered the nest by startling the parent bird from it with a cut from my stick at a viper, which lay coiled up within a foot of her as she sat. The nest in this case was entirely composed of dry grass-stalks, the finer of which formed the lining, and contained four eggs, of a yellowish white, closely spotted with light brownish lilac, the markings being almost confluent at the larger end. Mr. A. G. Elliott, of Stamford, informs me that he is acquainted with a certain spot in North Northamptonshire in which a pair of Wood-Larks may generally be found during the breeding-season. This bird is not mentioned by Morton.

# THE FLORA OF NORTHAMPTONSHIRE.

*(Continued.)*

By G. C. Druce, F.L.S.

Umbelliferæ.

*552. Hydrocotyle vulgaris, L. Pennywort. Wet, peaty places, local and rare.

Dallington Heath, Foxhall bog, Nene a; Whitewater side (Jones), Wittering, side of Roman road, Bedford purlieus, Nene c; Wakefield lower pond side, Ouse.

554. Sanicula Europœa, L. Wood Sanicle. Damp shady places.

Harleston Heath, Berry Wood, Salcey Forest, Preston Wood, Plain Wood, Dodford, Heyford, Badby, Nene a; Yardley Chase, Abington (B), Rushton, Hardwick Wood (Sir Jno. Robinson), Nene b; Wittering, Brigstock, Peterboro' (P), Nene c; Wappenham, Whittlebury Forest, Ouse; Rockingham, &c., Welland; Daventry Wood (N), Avon.

556. Eryngium campestre, L.

Road side. Watling Street, near Brockhall. A plant noticed by old writers from Gough's Camden, last recorded in print by Notcutt, 1843, who says: "nearly extirpated in consequence of the rapacity of collectors and the fondness of cattle for it; a specimen may now and then be found."

Colonel Clarke, of Welton, has some plants still growing in his garden from this locality; and so, too, has the Rev. Thornton, to whose kindness the Society is indebted, for the specimen in their herbarium. In the Museum herbarium is a specimen collected by Professor Henslow, from the above locality, which I have repeatedly searched without success, and am afraid the plant is extinct.

*557. Cicuta Virosa, L.

North bank dyke, Peterboro'. Paley only record, probably an error. Other recorders have included it in their lists erroneously.

*558. Apium, graveolens, L. Wild Celery. Damp places, not indigenous.

Welton (B), Nene a; Great Billing (B), Doddington, Nene b; Benefield (Lewin), Nene c.

The wild celery is rather a poisonous plant, especially when growing in wet places; but grown in dry soil, and earthed up so as to etiolate the stems, renders it quite wholesome.

559. Helosciadum nodiflorum, Koch. Ditches, shallow brooks, &c. Common, and generally distributed as at Kingsthorpe, &c., Nene a; Delapre, Nene b; Fotheringhay, Nene c; Moorend, Ouse; Duddington, Welland; Sulgrave, Cherwell; Elkington, Staverton Glen (N), Avon.

The variety *repens* occurs at Foxhall bog.

*560. Helosciadum inundatum, Koch. Still brooks, ditches, &c. Rare, but perhaps overlooked.

Irthlingboro' meadows, Nene b; Denshanger river side, Ouse,

*561. *Petroselinum sativum*, L. Parsley. Waste ground. Rare, and not indigenous.

Kingsthorpe escape, Wootton, Nene a; Grafton Underwood garden escape, Nene b; Weldon, Nene c; Stamford, Welland.

The parsley was formerly considered an antidote to poisons, but its power of masking powerful odours most likely led to such a belief.

562. Petroselinum Segetum, Koch.

A little above White Horse Inn, Oxendon. Morton's History.

Not recently recorded.

563. Sison Amomum, L. Hedge sides, &c. Not uncommon.

Harleston road, Boughton, Harpole, Blisworth, Weedon, Newnham, Welton road, rare (Notcutt), Nene a; Hardingstone road, Wilby, Weekley, Nene b; Benefield, Wigsthorpe, Peterboro' (P), Nene c; Yardley Gobion, Stoke Bruerne, Cosgrove, Ouse.

563. Egopodium Podagraria, L. Hedges and shady places; generally near Villages, and in most cases a relic of remote cultivation.

Dallington road, Boughton, Berry Wood, Badby, Dodford, Newnham (N), between Crick Station and Ashby St. Ledgers, Nene a; Wellingboro', Overstone (Birch), Rushton, Nene b; Peterboro' (P), Nene c; Cottenham, Welland; Banbury (F), Cherwell; Staverton Glen (N), Yelvertoft, West Haddon, Avon. It is rare if not absent from the Ouse district.

The gout weed, or Herb Gerarde, was formerly held in great reputation as a remedy for gout. Its creeping stems are very difficult to eradicate from gardens or shrubberies when once established.

*567. *Carum Carui*, L. Caraway. Waste places, rare, and only a casual.

Kingsthorpe garden escape, Nene a; Sewage works, Nene b; rail side Warkworth (F), Cherwell.

The uses of Caraway seeds are numerous, large quantities being used in confectionery; a water distilled from them is used in Pharmacy, and they

are also used in several preparations for their aromatic and stimulant properties. The Caraway of Shakespeare was probably a variety of apple.

569. Bunium flexuosum, With., Earth-nut—Pig-nut. Banks, woods, etc. Rather common.

Harleston, Kingsthorpe, Foxhall, Danes' Camp, Badby, Weedon, Norton road (N), Nene a; Castle Ashby (Rogers), Overstone (Birch), Nene b; Fotheringhay, Bedford Purlieus, Nene c; Potterspury, Whittlebury Forest, Ouse; Stamford, Welland; Canons' Ashby, Cherwell; Elkington, Avon.

The Pig-nut is often eaten by village children, and is not injurious.

Shakespeare makes Caliban say—

"I prithee let me bring thee where crabs grow,
And I with my long nails will dig thee Pig-nuts."

The roots lie deep, and as Johnson says, "If the youngster break the stem he desists from further search, believing that the root will elude him by sinking deeper in the ground."

570. Pimpinella Saxifragra, L. Calcareous ground. Rather common.

Brampton road, Spratton, Moulton Park, Boro' Hill (N), Harleston, Upton, Piddington, Nene a; Overstone, Finedon, Warkton, Nene b; Lilford, Wittering, Nene c; Cosgrove Quarries, Grafton Regis, Wakefield, Ouse; Barnack, Collyweston, Welland; Church-hill Meadow, Grimsbury, with enlarged petals (French), Cherwell.

571. Pimpinella magna, L. Clayey ground. Rare and local.

Foxhall, Salcey Forest, Plain Woods, Nene a; Easton Maudit brook (Miss Brent), Denton (Rogers), Nene b; Bedford Purlieus (Berkeley), Peterboro' (P), Nene c; road side, near Grafton Regis, Ouse; between Brackley and Banbury (French), Thorpe Mandeville (Rogers), Cherwell.

Var *dissecta*. Reichenbach, near Wappenham (Miss Scott).

572. Sium latifolium, L. River sides. Rather rare.

Holdenby (B), Upton (B), extinct I believe, Nene a; Nene side, near Ditchford and Doddington, Nene b; at intervals along the Nene from Thrapston to Peterboro', common about Oundle and Wansford, Nene c; Astrop (Beesley), Cherwell; Barby (Baker), Avon.

A handsome and conspicuous plant; much rarer in the Nene than in the Thames valley.

574. Bupleurum notundifolium, L. Calcareous fields. Rare.

Thornhaugh (Berkeley), Southwick (Lewin), Helpstone and Willow Hall (Paley), Nene c; Cornfields, Croughton (French), Cherwell.

A rare plant, and probably getting scarce in this as in other counties. I have never seen it in Northamptonshire.

578. Enanthe fistulosa, L. Wet, marshy places. Local and rare.

Upton meadows, Nene a; meadow below Peterboro', Nene c; Bradland pond side on Wakefield Lawn, some specimens strangely dwarfed, Ouse; Kingsutton bog (French), Cherwell. Marked as personally seen by Mr. Watson in Top. Bot.

*580. Enanthe silaifolia, Bieb.

Kingsutton bog (French and Beesley), Cherwell. I have not seen specimens.

*582. Enanthe crocata, L.

Included in Paley's list of Peterboro' plants, and also recorded by Mr. Bodger, but probably in error, as I think Northants is like Cambridge —a true exception to its general occurrence in England.

This is one of our most poisonous plants, and has probably caused more deaths than any other.

583. Enanthe Phellandrium, Lam. In ditches, dykes, &c. Rare.

Irthlingboro', Nene b; below Peterboro', Nene c, where it was noticed by Mr. Waton, Cherwell; Huscote (F).

This is far rarer than *E. fluviatilis.*

584. Enanthe fluviatilis, Coleman. Shallow river.

Above Northampton, in Nene a; at Irthlingboro', &c., Nene b; Oundle, &c., Nene c (Top. Bot. Watson).

585. Ethusa Cynapium, L. Fool's Parsley. Cultivated ground. Common in all the districts.

This was formerly considered very poisonous, but recent experiments do not confirm the belief.

* Fœniculum Vulgare, Gaert. Fennel.

Occurs only as a rare casual or garden escape, with no pretensions to nativity.

The Fennel has been in cultivation for a long period, and was supposed to abound in virtues described by Longfellow in these lines:—

Above the lowly plant it towers,
The Fennel with its yellow flowers,
And in an earlier age than ours
Was gifted with the wondrous powers—
    Lost vision to restore.

It gave new strength and fearless mood,
And gladiators fierce and rude
Mingled it with their daily food;
And he who battled and subdued
    A wreath of Fennel wore.

The fruits are still used in medicine as a Carminative and Aromatic.

(Seseli Libanotis, Koch, is included in Paley's list, clearly an error.)

589. Silaus pratensis, Bess. Dry pastures, field borders, &c. Local.

Kingsthorpe, Boughton, Foxhall, Harpole, Welton, Gayton, Daventry reservoir (Notcutt), Blisworth, Weedon, Rothersthorpe, Nene a; Geddington, Cranford, Grendon (Brent), Kettering (Lewin), Nene b; Fotheringhay, Barnwell Wolds, Wittering, Peterboro' (P), Nene c; Stoke Bruerne, Yardley Gobion, Ouse; Barnack, Welland; Aynhoe (F), Purston or Burton (Beesley), Cherwell; Barby (Notcutt), Avon.

592. Angelica Sylvestris, L. Wet spinneys, canal and river sides, osier holts &c.

Common, and generally distributed as at Dallington spinney, Nene a; Sywell, Nene b; Denford, Peterboro', &c., Nene c; Whittlebury Forest, Ouse; Fineshade, Welland; Byfield, Cherwell; Daventry wood (Notcutt), Avon.

(Pencedanum palustre, Mœnch. Said to have formerly grown in Midsummer meadow).

596. Pastinaca sativa, L. Parsnip. Road side, field border, &c. Generally distributed.

Kingsthorpe, Moulton Park (B), Upton, Bugbrooke (B), Nene a; Irthlingboro', Weekley, Kettering (Lewin), Nene b; Weldon, Peterboro' (P), Nene c; Silverstone, Stoke Bruerne, Ouse; Collyweston, Welland; Coventry, Cherwell.

The edible Parsnip is produced from this plant by cultivation.

597. Heracleum Sphondylium, L. Hogweed. Hedges, woods, &c. Common in all the districts. A variety with narrow leaves occurred at Coppice Moor, near Yardley Gobion, Ouse.

The young leaves, when boiled, make a very wholesome and pleasant vegetable.

599. Daucus Carota, L. Wild Carrot. Road sides, field borders, &c. Common in all the districts.

This is the origin of the garden carrot; in the wild variety the root is woody and small. The Daucus may be readily recognised from other Umbelliferæ, by its very concave umbels resembling a bird's nest, when in fruit, whence its old Anglo-Saxon name—bird's nest.

Shakespeare notices the plant once in Merry Wives—

> Evans: Remember, William, focative is caret.
> Dame Quickly: And that's a good root.

An elegant ornament for table decoration in winter may be made, by cutting off the top of a large carrot, and placing it in a saucer of water, when the leaves shortly sprout from the crown in graceful and pleasing luxuriance.

600. Caucalis daucoides, L.

Thornhaugh (Berkeley), Nene c; Denshanger stone pit, (Morton's History), Ouse.

This plant I have never been able to find in the county.

601. Torilis infesta, Spreng. Cornfields. Rather common in all the districts, as at Kingsthorpe, Nene a; Billing, Nene b; Thornhaugh, Nene c; Potterspury, Ouse; Collyweston, Welland; Greatworth, Cherwell; Welton, Yelvertoft, Avon.

602. Torilis Anthriscus, Gaert. Hedge sides, &c. Very common throughout the county.

603. Torilis nodosa, Gaert. Dry field borders, &c. Local and not very common.

Harleston, Dallington, Boughton, Blisworth, Rothersthorpe bridge, Nene a; Delapre meadows near rail crossing, Yardley Hastings (R), Grafton Underwood, very common; Grendon (Brent), Nene b; Peterboro' (P), Nene c; Collyweston, Welland; Boro' Hill (Notcutt), Avon.

604. Chœrophyllum Anthriscus, Lain. Keck. Hedges and spinneys, etc. Very abundant throughout the county.

The local name Keck is given to this plant in our villages where the young plants are often gathered for rabbits.

Shakespeare uses a similar name—

> "And nothing teems
> But hateful Docks, rough Thistles, Kecksies, Burs,
> Losing both beauty and utility."

606. Chœrophyllum Sylvestre, L. On walls, &c. Not rare.

Dallington, Kingsthorpe, Pattishall, Norton (Notcutt), Nene a; Cow-meadow, Great Oakley, Irthlingboro', Higham Ferrers, Overstone (Birch), Nene b; Peterboro (P), Nene c; Rockingham, Barnack, Wilbarston, Collyweston, Welland; Banbury (French), Cherwell.

Unobserved in Ouse and Avon district; and the plant is very rare or absent in the neighbourhood of Oxford.

The young foliage of this plant is most lovely, the delicate cutting and soft green tint bringing it in beauty near to some of our more elegant ferns.

607. Cherophyllum tremulum, L. Hedge sides, &c. Common, but less so than *Torilis Anthriscus*, or *Chœrophyllum Anthriscus*, which it somewhat resembles,

Badby, Blisworth, Nene a; Billing, Nene b; Peterboro', Nene c; Yardley Gobion, Ouse; Banbury (F), Cherwell; Barby (Trott); Drayton (Notcutt), Avon.

(*608. Myrrhis odorata, Scop. In Preston Capes street. Baker's History—now extinct).

609. Scandix Pecten-veneris, L. Cultivated fields. Rather common.

Kingsthorpe, Moulton, Rothersthorpe, Eastcote, Piddington (Town Herbarium), and Nene a; Weston Favell, Irchester, &c., Nene c; Thornhaugh, &c., Nene c; Potterspury, Ouse; Ufford, Welland; Canons' Ashby, Cherwell.

610. Conium maculatum, L. Hemlock. Woods, hedges, &c.

Harleston, Brampton, Duston, Hackleton, Rothersthorpe, Nene a; Hardingstone, Delapre spinney (8 feet high), Abington (B), Cransley, Grafton Underwood, Denton (Rogers), Nene b; Brigstock, Bedford Purlieus, Nene c; Cosgrove, Whittlebury Forest, Stoke Bruerne, Ouse; Fineshade, Welland; Thorpe Mandeville (Rogers), Buckby road (Notcutt), Avon.

The Hemlock—one of our dangerous plants—may be known from our other native Umbelliferæ, by the smooth stem, blotched with reddish brown, and its leaves free from hairiness.

It is frequently used in medicine in form of an extract, prepared from the fresh leaves, and an expressed juice; it owes its activity to the presence of Conia, one of the few liquid bases.

The Hemlock is said to be the poison that killed Socrates.

The plant, although so deadly, is an ornament to some of our thickets and hedgerows.

Shakespeare, in Henry V., writes—

> "Her fallow leas,
> The Darnel, Hemlock, and rank Furniter
> Doth root upon."

And the Witch, in Macbeth, uses

> "Root of Hemlock, digged in the dark."

# NOTES ON LOCAL GEOLOGY.

## *Part VII.*

### THE MARLSTONE OR MIDDLE LIAS.—*(Continued.)*

In my last paper on the Marlstone I described a number of sections I had visited at and around Banbury. Since writing that, I have devoted what time I could spare for field work to the district lying between Banbury and Daventry. I have visited a large number of sections, most of them showing the rock-bed with the lower beds of the Upper Lias above it, and a few the beds below the rock-bed. It is the latter that I propose chiefly to describe in this paper.

I would here take the opportunity of acknowledging the help I have received from a pamphlet, by Mr. E. A. Walford, of Banbury, on "*Some Middle and Upper Lias Beds in the Neighbourhood of Banbury.*"

About half-way between BANBURY and CHALCOMB there is a hill which overlooks Chalcomb on the one side, and Banbury on the other, and on the side of this hill facing Banbury, near to what is called *Gibbard's farm*, there is a good section of the Middle Lias, almost to its base (Survey division.) The section is quite away from any road, and consequently rather difficult to find. We were induced to look for this section from seeing a very pretty specimen of crystallized carbonate of lime, that had come from it, at the inn in Chalcomb.

SECTION NEAR TO GIBBARD'S FARM, CHALCOMB.

| | | ft. | in. |
|---|---|---|---|
| No. 1. | Soil and light coloured clay ... ... ... | 3 | 0 |
| ,, 2. | Sandy clay or shale, more or less ferruginous. Appears to get a red exterior by exposure. *(Similar to No. 4, but could not get at it as well)* ... ... ... ... ... ... | 2 | 3 |
| ,, 3. | Band of *ironstone concretions*, many fossils, and many pebbles apparently ... ... ... | 0 | 9 |

| | | ft. | in. |
|---|---|---|---|
| No. 4. | Sandy clay or shale, light grey colour, *micaceous*. Joints and surface reddish. No effervescence with acids. Many fossils, but the material so soft and wet that they were difficult to get out:—*Ammonites (small), Avicula inæquivalvis, Pecten æquivalvis, Pecten liasinus, Modiola Cardium, &c.* ... ... ... ... ... | 2 | 7 |
| „ 5. | Hard calcareous rock, very much *crystallized carbonate of lime* in it, some parts of it full of fossils, but these not easily got out or identified. Some of the crystallized parts were very pretty, suggesting coral, but could not confirm this supposition ... ... ... | | |

The thickness of the last bed we could not make out, but it is certainly not very thick because a *spring* issues from a point on the hill very little below, probably not more than two feet.

Near to the section just described, at least on the same ridge of land, are two or three other sections of the Marlstone, but they only expose the rock-bed, and have been mentioned in a previous paper.

On the part of the EAST AND WEST JUNCTION RAILWAY, extending from near Aston-le-Wall to Byfield, are several sections of the Middle Lias, exposing, altogether, the whole of the beds of the "*spinatus*" zone, and the greater part of the "*margaritatus*" zone. The lower beds of the Upper Lias are also shown.

The various beds are very much covered up now, nevertheless, with the aid of Mr. Waltord's pamphlet, we were able to make them out pretty well, and we collected a good many fossils from the hard beds.

The first of these sections, on going from Aston-le-Wall, is about a quarter-of-a-mile N.E. of BODDINGTON ROAD BRIDGE. It is very much obscured now, but near the top is a reddish shaly stone containing many fossils. The following were collected :—

Pholadomya ambigua.
Protocardium truncatum.
Pecten liasinus.
Limæa acuticosta? etc.

Mr. Walford mentions a "fault" as occurring just here, which causes a considerable difference in the inclination of the beds of this and the next section which is about a hundred yards off. The hard bed just referred to most likely belongs to the "*spinatus*" zone.

About a hundred yards from the section referred to above as the first is another one, exposing two of the hard beds of the Marlstone. In the description below I have numbered the beds so as to show the connection between them and those of the section next described.

No. 6. Marly limestone, rather soft, and containing *Ammonites margaritatus, Protocardium truncatum, Modiola Scalprum, Pholadomya ambigua, Pectens*, etc.

,, 7. A soft bed, too much covered up to be examined.

,, 8. Sandy limestone, rather hard, and containing:—*Modiola, Trochus, Cardita multicostata*, etc.

These beds appear to belong to the *Zone of Ammonites margaritatus.*

SECTION ON THE E. AND W. JUNCTION RAILWAY, S. OF BYFIELD POOL.

| | | | ft. | in. |
|---|---|---|---|---|
| "Spinatus" Zone. | No. 1. | Soil ... ... ... ... ... ... .. ... | 1 | 8 |
| | ,, 2. | Marlstone rock-bed, shaly ... ... ... ... | 2 | 0 |
| | ,, 3. | Marly clay ... ... ... ... ... ... ... | 1 | 6 |
| | ,, 4. | Soft sandy limestone ... ... ... ... ... | 0 | 4 |
| | ,, 5. | Marly clay ... ... ... ... ... ... ... | 2 | 7 |
| "Margaritatus" Zone. | ,, 6. | Soft marly limestone, shaly, and containing:—*Ammonites margaritatus (many), Belemnites and Phragmacones, Pholadomya ambigua, Myacites unioides (abundant), Modiola, Protocardium truncatum, Cardita multicostata? Limæa acuticosta, Avicula inæquivalvis, Plicatula spinosa, Ostrea sportella, Acromya hispida? Serpulæ*, etc. | 3 | 2 |
| | ,, 7. | Sandy marl, containing *Ammonites Margaritatus*, etc. | 6 | 2 |
| | ,, 8. | Soft sandy limestone, containing *impressions of fucoids, Ammonites Margaritatus, Pholadomya (more plentiful than in No. 6), crystallized carbonate of lime* ... ... ... ... ... | 3 | 3 |

For the description of the soft beds, Nos. 3, 5, and 7, in the above section, I am entirely indebted to Mr. Walford's pamphlet before referred to, but the hard beds can still be got at fairly well.

Mr. Walford says a hard shelly limestone, containing *cardita multicostata*, was met with below, and that the dip of the beds is 4° S.

There are several other sections between the one just described and Byfield, but none of them exposing the beds below the rock-bed, so I leave these for the present.

I know of no other sections of the Marlstone, between Byfield and Staverton, in which the beds below the rock-bed are exposed, except two poor ones near to HELLIDON; one being at DAY KNOWL, and the other between Day Knowl and Hellidon. Both of these are sections by the side of brooks, with high and steep banks, and show the junction of the Middle and Lower Lias (Survey division), the latter being known by dark blue clay.

On the W. of Staverton there is rather a steep lane, and at the bottom of it a deep section, showing the junction of the Middle and Lower Lias (Survey division.)

SECTION IN LANE ON WEST SIDE OF STAVERTON.

| | | ft. | in. |
|---|---|---|---|
| No. 1. | Soil, etc. ... ... ... ... ... ... ... | 3 | 0 |
| ,, 2. | Soft porous sandstone, light red in colour, very full of fossils :—*Protocardium truncatum (abundant), Avicula, Cardita multicostata, Pentacrinite stems* ... ... ... ... | 2 | 9 |
| ,, 3. | Sand, or sandy clay, light colour, micaceous, also ferruginous in places ... ... ... | 4 | 0 |
| ,, 4. | Hard ferruginous bed, interior of stone bluish or slaty colour, containing :—*Pentacrinite stems, Protocardium truncatum, Limæa acuticosta?* | 2 | 0 |
| ,, 5. | Sand or sandy clay, rather hard, light coloured, micaceous. Contains a few fossils but these difficult to get out ... ... ... ... | 5 | 9 |

At this point a *strong spring* issues from the rock, and has cut deeply into the next bed.

| | | ft. | in. |
|---|---|---|---|
| No. 6. | Hard fossiliferous limestone, very ferruginous, and containing much *crystallized carbonate of lime.* In some parts the face of this bed is coated with carbonate of lime, and is almost like a stalactite in appearance, and the rock itself, in parts, is full of little cavities from which the carbonate of lime has evidently been dissolved. Fossils found :—*Belemnites, Protocardium truncatum, Tentacular fragments of Pentacrinite* ... ... ... ... | 1 | 4 |
| ,, 7. | Hard blue clay. Depth unknown. | | |

The section is perhaps 12 feet or more deeper, but is so covered up that nothing more could be made of it.

The only bed of the Marlstone (Survey division) which is used for any economic purpose is, I think, the rock-bed; and this, no doubt, accounts for the fact that there are so few sections to be seen of the beds below the rock-bed, whereas sections of this and the beds just above it are common in the district I am now describing.

Where the rock-bed is near the surface, as it is around Hellidon, Staverton, Badby, Newnham, etc., quarries appear and disappear with the necessities of the district, and hence very few of those described in the memoirs of the Geological Survey, as existing in this part of the country can now be found.

In part VI. of these notes a few sections including the rock-bed were described, and I propose here to describe a few others.

There is a section of the rock-bed at EDGCOTT, not far from the church; it has the usual characters, and from it I obtained a few very large specimens of *Rhynconella tetrahedra.* At the top, and mixed with the soil, are some broken pieces of limestone, containing *A. serpentinus, A. communis,* etc., evidently the remains of the *Cephalopoda bed.*

Near to CHIPPING WARDEN there are two sections of the rock-bed. One of them two or three fields from the village, towards Warden Hill, section about 5 feet; and the other about one mile from Warden, towards Byfield, about which I shall have something to say in a future paper.

At ASTON-LE-WALL—the Rectory Pit—and again at APPLETREE, the rock-bed is exposed to a depth of about 6 feet.

On the EAST AND WEST JUNCTION RAILWAY, between the sections previously described and Byfield, the *rock-bed* is well exposed, and two or three old quarries exist to the right and left of the railway. The rock here is very ferruginous, and in some parts quite sandy. Several "*faults*" too occur in this neighbourhood. Two of these are shown in the diagram accompanying this paper. The first of these is just by the side of PRIOR'S MARSTON ROAD BRIDGE, but is not very well seen now, as it is very much covered up. The line of dislocation is N.E. by N., to S.W. by S. The beds of the Marlstone and Upper Lias here have a gentle dip westward, and the "fault" has only had the effect of altering the dip and position over a space of about twenty yards. The second "fault" is in a small quarry between the last described and Byfield station, where the rock-bed has been quarried for ironstone, and it may still be seen very distinctly.

A shallow pit occurs near to WARDEN GRANGE, about one mile from Byfield, but it has not been worked recently.

On BLACKDOWN FARM, about half-a-mile beyond IRON CROSS, towards Hellidon, there is a section of the rock-bed of 5 or 6 feet. The rock seems to be a ferruginous sandstone. About midway in the section is an irregular layer full of ossicles, and broken shells of many kinds; in some parts the layer is soft and sandy, and in others hard, but appears to weather easily. Just above this layer is a hard bed containing many specimens of *Waldheimia resupinata*, a brachiopod which I have not met with in the rock-bed anywhere else in this district.

A little beyond the last-mentioned quarry, and about a mile-and-a-half from Hellidon, there is another quarry, showing about six feet of the rock-bed It is on STIRCH FARM, parish of Prior's Marston, and consequently in Warwickshire, but some parts of the quarry are not 12 inches out of Northamptonshire. A band of broken shells and ossicles, similar to that described in the last section is present here.

At UPPER CATESBY, just opposite the Staverton road, is an old quarry. The following is the section :—

| | | ft. | in. |
|---|---|---|---|
| No. 1. | Soil, and fragmentary blocks of limestone—the *Cephalopoda bed*—containing *Ammonites cæcilia, etc* ... ... ... ... ... | 2 | 0 |

Fig. 1. Fault, East of, and close to Priors Marston Bridge Road, Byfield.

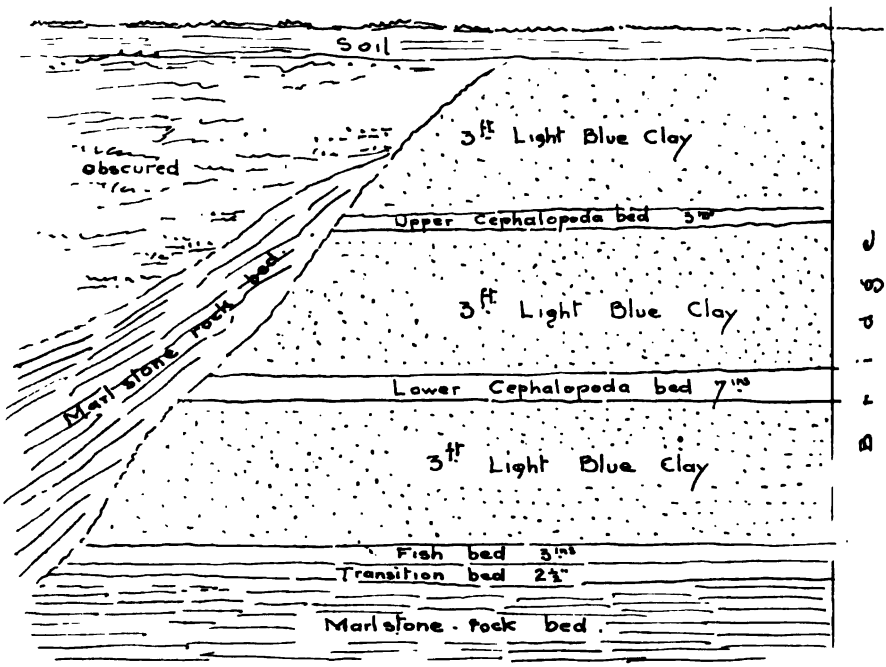
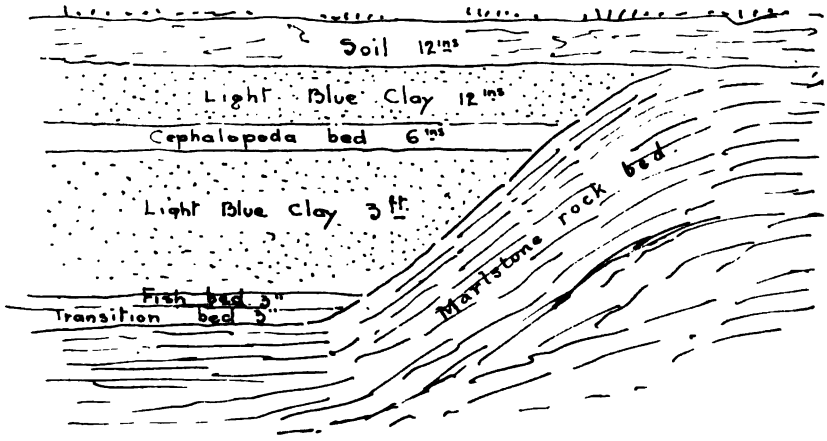



Fig. 2. Section in Quarry South of Byfield, between Priors Marston Road Bridge and Byfield Station.



| | | ft. | in. |
|---|---|---|---|
| No. 2. | Fish bed... ... ... ... ... ... ... | 0 | 2 or 3 |
| ,, 3. | Transition bed, with *Ammonites acutus, Eucyclus concinnus*, etc. ... ... ... ... ... | 0 | 2 |
| ,, 4. | Rock-bed, with usual fossils, also *wood* ... ... | 5 | 0 |

The beds Nos. 1, 2, 3, rather fragmentary.

I have not in these *notes on the Marlstone* described all the sections I have seen in which the Marlstone is present, because some will be better dealt with when treating of the Upper Lias; nor have I seen all that are to be seen, I think, nevertheless, enough has been written to enable a student of the subject to know where to find sections, and what to look for.

I have had before me, all the time I have been working at the subject, the idea of giving a typical section of the Middle Lias for this district. I am not able to do this as I could wish, since the number of sections below the rock-bed is small, but I do not think it necessary to delay it further, because these papers only profess to be "Notes" on the subject dealt with. One of my chief reasons for dissatisfaction lies in the fact that my typical section of the Marlstone must be within the limits of the Marlstone of the Survey.

TYPICAL SECTION OF THE MIDDLE LIAS OF THE W. AND S.W. OF NORTHAMPTONSHIRE.

| | | | Average thickness. ft. | in. |
|---|---|---|---|---|
| Zone of Ammonites Spinatus. | No. 1. | Marlstone rock-bed. A calcareous and ferruginous rock. Sometimes sandy, and often rubbly in character. Used for building and road-making purposes, and sometimes as an ironstone. Fossils abundant, but chiefly *Rhynconella tetrahedra, Terebratula punctata, large and small Pectens, and large Belemnites* ... ... | 6 | 0 |
| | No. 2. | Marly clay... ... ... ... ... ... ... | 1 | 6 |
| | ,, 3. | Soft sandy limestone ... ... ... ... ... | 0 | 4 |
| | ,, 4. | Marly or sandy clay ... ... ... ... ... | 2 | 6 |
| Zone of Ammonites margaritatus. | ,, 5. | Soft marly or sandy limestone, shaly, reddish brown colour, and very fossiliferous. Fossils: *Ammonites margaritatus, Protocardium truncatum, Modiola, Pholadomya, Pectens, Pleuromya costata, Cardita multicostata, Ostrea sportella*, etc. ... ... ... ... | 3 | 0 |

| | | Average thickness. ft. | in. |
|---|---|---|---|
| Zone of Ammonites margaritatus | No. 6. Sandy marl or clay, light grey colour, micaceous and ferruginous, red at joints; containing *Ammonites margaritatus, etc.* ... ... ... | 5 | 0 |
| | ,, 7. Soft sandy limestone, containing *Ammonites margaritatus, Modiola, Pholadomya, Cardita multicostata, and crystallized carbonate of lime*, etc. ... ... ... ... ... ... | 3 | 0 |
| | ,, 8. Sandy clay or shale, light grey, micaceous, joints and surfaces reddish. Fossils difficult to get and keep, material so soft. Fossils :—*Avicula, Pectens, Modiola, Cardium*, etc ... ... ... | 6 | 0 |
| | ,, 9. Hard, shelly limestone, much crystallized carbonate of lime in it... ... ... ... ... ... | 1 | 6 |

The whole of the beds given in this section seem to be very pervious to water, with the exception of the upper clay bed. The reason for excepting this bed rests on the following circumstance. In and around Staverton are several pools of water apparently resting on the Marlstone. They are situated as follows: first, about a quarter-of-a-mile along the Daventry road, on left-hand side; second, just at the corner of the Daventry road, and in Staverton; third and fourth, close to each other on the N. side of Staverton; fifth, about the centre of the village. The explanation given of these in the Memoirs of the Geological Survey, is that near the top of the Marlstone are some clay beds, and between them and the Upper Lias, rubbly beds (Marlstone rock-bed) intervene which contain water, which is held up and thrown out by the clay below, so that where the Marlstone rock-bed is thin, a line of springs would indicate that the junction of the Middle and Upper Lias was not far above.

Some blocks of Marlstone may be seen round pond No. 1, and at the back of Nos. 3 and 4 about three feet of rock-bed may be seen, the hedge growing on the top of it.

This imperviousness of the upper bed of clay may account for a remark I have heard made with respect to the supply of water from the Marlstone, that the water only came from cracks in the rock-bed, Probably the water from the porous beds below would only get through where the clay bed had been broken into by a dislocation.

The sandy marls, and marly clays, and limestones below the rock-bed seem to be very pervious to water, and the sandy marls seem capable of holding large quantities of water. These are no doubt the beds by which the greater part of the water of the Marlstone circulates from one place to another, and I certainly expect, at no very distant point of time, to see these beds made use of as a reservoir for very much of the surface water which now does such damage to low-lying districts. There are many arguments in favour of this, and, so far as I know, there is only one serious one against it.

The great difference between the beds I have been describing and the blue clay immediately below, is shown by the prevalence of *springs* at the junction of the two. There are several of these springs around Staverton, and one of them constitutes the source of that branch of the Nen which runs through Weedon and Kislingbury.

I propose in the next paper to say something about the fossils of the Marlstone.

B. THOMPSON.

## METEOROLOGICAL REPORT FOR JANUARY, FEBRUARY, AND MARCH, 1882.

The weather during January was chiefly exceptional for the high Barometer readings which occurred, and also for the prevalence of fog, but both of these conditions are intimately related to one another; indeed the fog may with a certain amount of fairness be attributed to the high Barometer which continued with such persistency.

The greater part of the Rainfall was during the first eight days of the month, the amount registered on the 8th being the maximum by nearly all observers, and varying from .50 at Rothwell to .102 at Whittlebury. After this the Barometer rose steadily, reaching, on the 18th, a height variously reported in the County from 30.5 at Fawsley to 30.76 at Twywell, corresponding to a height of more than 31 inches if connected to sea level. During the period of high pressure, which lasted in all 21 days, from the 8th to the 29th, in 15 days of which, from the 12th to the 26th, the Barometer was above 30in., a remarkable state of things prevailed which will be long remembered. No rain fell though the sky was obscured by clouds, and fogs were general. Day after day passed in a monotony which seemed as if it would be interminable, and which can only be described by negatives—no rain, no wind, no sunshine, and nothing in fact to chronicle as making one day unlike another.

Lady Knightley mentions the "intense stillness, distant sounds being heard with startling distinctness, *i.e.* the bugles at Weedon being heard at Fawsley, a distance of 4½ miles, measured straight on the map."

All our correspondents speak of the mildness of the weather and the forwardness of vegetation, many spring flowers being in bloom throughout the month, while the call notes of birds pairing were heard, and bats and beetles were seen on the wing. Unfortunately the mildness of the season was favourable to the spread of infectious diseases of all kinds, typhoid fever, scarlet fever, measles of a very virulent type, and hooping cough being unusually prevalent. The Rev. H. Waller, however, remarks that "it is worthy of notice that vitality seems to have been high, *i.e.* in cases where fatal results might ordinarily have been anticipated, the reverse has been the case, and the actual mortality has not been in proportion to disease; possibly," he adds, "the high atmospheric pressure may have had its influence here."

The Barometer fell slightly towards the end of the month, and rain fell on the 28th and 29th, but the temperature still continued high.

The first fortnight in February was beautifully fine and warm, the conditions being similar to those prevailing in January, but with clearer skies. The sudden storm of snow and rain on the night of the 14th, in which fell the greatest amount registered at most stations, brought only a temporary chill, the snow not lying on the ground, and the temperature rising to its original level by the 16th. Fine weather continued from this time until nearly the end of the month.

March is recorded by the Rev. H. Waller as "again a month of abnormal weather—abundant sunshine and drying winds have left nothing to be desired for agriculture, indeed if it be possible to express a want it is that the land requires rain to work kindly. The same absence of Easterly winds is a marked feature as it has been for several months. An abundance of fruit blossom gives hope for the coming season, and the hoar-frost which we have will hardly as yet do damage. From observations taken between Edinburgh and London we may safely say that vegetation is more forward in the Midlands than in any other section between these two points." Lady Knightley also remarks that "vegetation is wonderfully forward—on the 13th the following were in full bloom :—Elm, ribes, mezereon, daffodils, hepaticas, celandine, marsh marigold, hellebore, dog's mercury, &c. By the end of the month the hedges were in full leaf, the larch quite green, and a horse chestnut with its leaves half expanded." Rainfall was again below the average, the only heavy fall being on the night of the 25th, which the searching winds and sunshine of the following days dried up almost immediately.

The Editors wish to thank the various contributors for the very valuable reports sent in for the past quarter, and to express a hope that their assistance may be continued through the year. Particular attention should be paid to the development and direction of thunderstorms, and other local phenomena.

# METEOROLOGICAL OBSERVATIONS, 1882.

## JANUARY, 1882.

| STATION. | OBSERVER. | RAINFALL. Total for Month. | Total for Year. | Greatest Fall. In. | Greatest Fall. Dats. | Wet Days. | SHADE TEMPERATURE. Maximum. Deg. | Maximum. Date. | Minimum. Deg. | Minimum. Date. |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 1·52 | 1·52 | ·82 | 8 | 7 | 52 | 24 | 29 | 24 |
| " .. | S. Law..... | 1·44 | 1·44 | ·79 | 8 | 7 | 49 | 6, 28 | 28 | 25 |
| Castle Ashby .. | R. G. Scriven..... | 1·63 | 1·63 | ·74 | 8 | 7 | 54 | 1 | 29 | 24 |
| Weedon ..... | R. Capell ..... | 1·84 | 1·84 | ·88 | 8 | 7 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 1·61 | 1·61 | ·67 | 8 | 10 | 53 | 6 | 28 | 21 |
| Rothwell ..... | J. More, M.D..... | 1·42 | 1·42 | ·50 | 8 | 8 | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | 1·40 | 1·40 | ·52 | 8 | 7 | .. | .. | .. | .. |
| Towcester ..... | J. Webb ..... | 1·76 | 1·76 | ·93 | 8 | 8 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 1·54 | 1·54 | ·83 | 8 | 6 | 49 | 6 | 30 | 21 |
| Fawsley ..... | Lady Knightley.... | 1·46 | 1·46 | ·74 | 8 | 7 | 51 | 6 | 27 | 24 |
| Thorpe Man'ville | Seth Barnes ..... | 2·03 | 2·03 | ·91 | 8 | 12 | 50 | 6 | 27 | 25 |
| Helidon ..... | C. J. Holthouse.... | .. | .. | .. | | | | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 1·51 | 1·51 | ·60 | 9 | 7 | .. | .. | .. | .. |
| Whittlebury ... | W. S. Miller ..... | 2·00 | 2·00 | 1·02 | 8 | 10 | 50 | 3, 6, 7 | 24 | 25 |
| Haselbeach .... | E. T. Morgan..... | 1·75 | 1·75 | ·87 | .. | 12 | .. | .. | .. | .. |
| Average 16 years 1866-81 ..... | H. Terry ..... | 1·52 | 1·52 | .. | .. | .. | .. | .. | .. | .. |

## FEBRUARY, 1882.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 1·71 | 3·23 | ·72 | 14 | 11 | 52 | 25, 26 | 26 | 1 |
| " .. | S. Law..... | 1·66 | 3·10 | ·70 | 14 | 11 | 53 | 25 | 22 | 2 |
| Castle Ashby .. | R. G. Scriven..... | 1·74 | 3·37 | ·60 | 14 | 11 | 55 | 25, 26 | 25 | 1 |
| Weedon ..... | R. Capell ..... | 2·17 | 4·01 | ·74 | 14 | 8 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 1·99 | 3·60 | ·72 | 14 | 11 | 55 | 13, 26 | 24 | 1 |
| Rothwell ..... | J. More, M.D..... | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | 1·66 | 3·06 | ·66 | 14 | 7 | .. | .. | .. | .. |
| Towcester .... | J. Webb ..... | 1·91 | 3·67 | ·68 | 13 | 10 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 1·72 | 3·26 | ·55 | 14 | 11 | 49 | 26 | 28 | 1 |
| Fawsley ..... | Lady Knightley .. | 1·99 | 3·45 | ·62 | 28 | 11 | 52 | 13, 25 | 25 | 1 |
| Thorpe Man'ville | Seth Barnes ..... | 2·50 | 4·53 | ·84 | 25 | 12 | 53 | 14 | 24 | 2 |
| Twywell Rectory | Rev. H. Waller .... | 1·22 | 2·73 | ·76 | 15 | 8 | .. | .. | .. | .. |
| Haselbeach .... | E. T. Morgan..... | 1·56 | 3·31 | ·73 | 14 | 9 | .. | .. | .. | .. |
| Average 16 years 1866-81 ..... | H. Terry ..... | 1·91 | 3·92 | .. | .. | .. | .. | .. | .. | .. |

## MARCH, 1882.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 1·23 | 4·46 | ·87 | 25 | 9 | 55 | 10 | 29 | 22 |
| " .. | S. Law ..... | 1·20 | 5·11 | ·90 | 25 | 10 | 61 | 18 | 29 | 23 |
| Castle Ashby .. | R. G. Scriven ..... | 1·19 | 4·56 | ·90 | 25 | 10 | 62 | 18 | 30 | 22 |
| Weedon ..... | R. Capell..... | 1·21 | 5·22 | ·75 | 25 | 9 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 1·41 | 5·01 | 1·04 | 25 | 10 | 66 | 18 | 26 | 14 |
| Rothwell ..... | J. More, M.D ..... | 1·24 | 4·32 | ·97 | 25 | 9 | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | 1·22 | 4·28 | 1·04 | 25 | 5 | .. | .. | .. | .. |
| Towcester ..... | J. Webb ..... | 1·13 | 4·80 | ·64 | 25 | 10 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 1·08 | 4·34 | ·85 | 25 | 9 | 51 | 29 | 33 | 4 |
| Fawsley ..... | Lady Knightley .. | 1·32 | 4·77 | ·64 | 25 | 12 | 58 | 18 | 28 | 21, 22 |
| Thorpe Man'ville | Seth Barnes ..... | 1·22 | 5·75 | ·77 | 25 | 7 | 65 | 18 | 23 | 23 |
| Twywell Rectory | Rev. H. Waller .... | 1·59 | 4·32 | ·92 | 26 | 8 | .. | .. | .. | .. |
| Haselbeach .... | E. T. Morgan..... | 1·19 | 4·50 | ·99 | 26 | 18 | .. | .. | .. | .. |
| Average 16 years 1866-81 ..... | H. Terry ..... | 1·55 | 5·48 | .. | .. | .. | .. | .. | .. | .. |

HENRY TERRY, SURGEON.

## ON THE DISPERSAL OF FRESHWATER BIVALVES.

*[The following will be read with interest. It contains the substance of the remarks made by Mr. W. D. Crick in a paper read at the Annual Meeting in March, 1882.]*

The wide distribution of the same species, and of closely-allied species of freshwater shells must have surprised every one who has attended to this subject. A naturalist, when he collects for the first time freshwater animals in a distant region, is astonished at their general similarity to those of his native European home, in comparison with the surrounding terrestrial animals and plants. Hence I was led to publish in *Nature* (vol. xviii. p. 120) a letter to me from Mr. A. H. Gray, of Danversport, Massachusetts, in which he gives a drawing of a living shell of *Unio complanatus*, attached to the tip of the middle toe of a duck *(Querquedula discors)* shot on the wing. The toe had been pinched so hard by the shell that it was indented and abraded. If the bird had not been killed, it would have alighted on some pool, and the Unio would no doubt sooner or later relaxed its hold and dropped off. It is not likely that such cases should often be observed, for a bird when shot would generally fall on the ground so heavily that an attached shell would be shaken off and overlooked.

I am now able to add, through the kindness of Mr. W. D. Crick, of Northampton, another and different case. On February 18 of the present year, he caught a female *Dytiscus marginalis*, with a shell of *Cyclas cornea* clinging to the tarsus of its middle leg. The shell was ·45 of an inch from end to end, ·3 in depth, and weighed (as Mr. Crick informs me) ·39 grams, or 6 grains. The valves clipped only the extremity of the tarsus for a length of ·1 of an inch. Nevertheless, the shell did not drop off, on the beetle when caught shaking its leg violently. The specimen was brought home in a handkerchief, and placed after about three hours in water; and the shell remained attached from February 18 to 23, when it dropped off, being still alive, and so remained for about a fortnight while in my possession. Shortly after the shell had detached itself, the beetle dived to the bottom of the vessel in which it had been placed, and having inserted its antennæ between the valves, was again caught for a few minutes. The species of Dytiscus often fly at night, and no doubt they generally alight on any pool of water which they may see; and I have several times heard of their having dashed down on glass cucumber frames, no doubt mistaking the glittering surface for water. I do not suppose that the above weight of 6 grains would prevent so powerful an insect as the Dytiscus from taking

flight. Anyhow this beetle could transport smaller individuals; and a single one would stock any isolated pond, as the species is an hermaphrodite form. Mr. Crick tells me that a shell of the same kind, and of about the same size, which he kept in water, "extruded two young ones, which seemed very active and able to take care of themselves." How far a Dytiscus could fly is not known; but during the voyage of the *Beagle* a closely-allied form, namely, a Colymbetes, flew on board when the nearest point of land was forty-five miles distant; and it is an improbable chance that it had flown from the nearest point.

Mr. Crick visited the same pond a fortnight afterwards, and found on the bank a frog which appeared to have been lately killed; and to the outer toe of one of its hind legs a living shell of the same species was attached. The shell was rather smaller than in the previous case. The leg was cut off and kept in water for two days, during which time the shell remained attached. The leg was then left in the air, but soon became shrivelled; and now the shell being still alive detached itself.

Mr. F. Norgate, of Sparham, near Norwich, in a letter dated March 8, 1881, informs me that the larger water-beetles and newts in his aquarium "frequently have one foot caught by a small freshwater bivalve *(Cyclas cornea ?)* and this makes them swim about in a very restless state, day and night, for several days, until the foot or toe is completely severed." He adds that newts migrate at night from pond to pond, and can cross over obstacles which would be thought to be considerable. Lastly, my son Francis, while fishing in the sea off the shores of North Wales, noticed that mussels were several times brought up by the point of the hook; and though he did not particularly attend to the subject, he and his companion thought that the shells had not been mechanically torn from the bottom, but that they had seized the point of the hook. A friend also of Mr. Crick's tells him that while fishing in rapid streams he has often thus caught small Unios. From the several cases now given, there can, I think, be no doubt that living bivalve shells must often be carried from pond to pond, and by the aid of birds occasionally even to great distances. I have also suggested in the "Origin of Species," means by which freshwater univalve shells might be far transported. We may therefore demur to the belief doubtfully expressed by Mr. Gwyn Jeffreys in his "British Conchology," namely, that the diffusion of freshwater shells "had a different and very remote origin, and that it took place before the present distribution of land and water."

CHARLES DARWIN.

[*Nature*, April 6, 1882.]

# Obituary.

## SAMUEL SHARP, F.S.A. F.G.S.

BORN JULY 18th, 1814; DIED JANUARY 28th, 1882.

[The remarks below concerning our late distinguished Hon. Member, taken from the *Geological Magazine* for April, 1882, will be read by our Members with interest, and will serve as a record of one who did us and his county great service.]

SAMUEL SHARP was born at Romsey in Hampshire, July 18th, 1814. He received his early education at a private school in Southsea, but owing to his father's death while he was still a boy, he removed with his family to Stamford in Lincolnshire. Mr. Sharp's stepfather was the proprietor and editor of the *Stamford Mercury*, the oldest and most widely circulated newspaper in the Midland Counties, and for some years Mr. Sharp assisted him in managing and editing this journal. From a very early age he had shown a taste for the study of science, especially Astronomy and Chemistry, and his attention appears to have been directed to the subject of Geology by a lecture delivered at Stamford by Mr. G. F. Richardson. Subsequently he had the advantage of studying the Oolitic districts around his home with Professor Morris, and other geologists, and gradually accumulated a large and valuable collection of fossils. In 1857, Mr. Sharp removed from Stamford, and went to live in the neighbourhood of Northampton. There he continued to collect largely from the Jurassic rocks, and his work was facilitated by the excavations then being carried on in all directions for raising the valuable iron-ore of the Northampton Sand. The general results of his observations on the district in which he lived were communicated to the Geological Society of London in two valuable papers on the Oolites of Northamptonshire, which were published in the Quarterly Journal. He wrote a little text-book, "The Rudiments of Geology," which has passed through two editions. As an Archæologist, Mr. Sharp was not less widely known than as a Geologist. On all questions of local antiquities he was one of the highest authorities in the Midland district, and many valuable papers relating to these subjects were contributed by him to the local journals. But it was as a Numismatist that Mr. Sharp especially distinguished himself. During the last thirty years he by unwearied exertions succeeded in bringing together an unrivalled collection illustrating the productions of the famous Stamford Mint. His valuable memoir on these interesting coins, with its several supplements, was published by the

Numismatic Society, and constitutes the best authority on the subject. He laboured energetically to found a good provincial museum in the town of Northampton, and placed therein valuable contributions from his own large geological and antiquarian collections. Mr. Sharp was one of the most genial and hospitable of men, and was never happier than when contributing to the instruction and pleasure of others from the stores of knowledge which he had gradually acquired concerning the geology and antiquities of his adopted county. During his later years Mr. Sharp was precluded from active exertions in the field by feebleness and ill-health, but to the end he took a lively interest in the advance of our science. He died at Great Harrowden Hall on the 28th January, 1882, in his 68th year.—J. W. J.

The following List of Mr. Sharp's Literary Labours, for the most part illustrative of the County, comprises chiefly Papers written by him in connection with various learned Societies. It has been collated by Mr. John Taylor, from his *Bibliotheca Northantonensis*, and by him has been kindly placed at our service.

History of Burghley House and its Contents in 1846. *Stamford.*

Sharp's Agricultural Compendium and General Advertiser for 1846. *Stamford.*

A Short History and Descriptive Sketch of Stamford. 1847.

The Solar System. 1848-1849.

A Handbook of Burghley, Northamptonshire. *Stamford*, 1851.

A Handbook of Burghley. [Second Edition.] *Stamford*, 1851.

An Essay in Condemnation of Cruelty to Animals. *Stamford*, 1851.

The Donthorpe Boys. *Stamford*, 1852.

The Widow of Thornthorpe. *Stamford*, 1852.

Written at the request of the Dowager Countess of Westmorland.

A Paper on Sidereal Astronomy. *Stamford*, 1852.

Historical Notice and Descriptions of St. Mary's Church, Stamford. *Lincolnshire Chronicle, October* 7, 1853.

Church Architecture. *Stamford*, 1853.

A General View of Geology. *Stamford*, 1853.

A Selection from the celebrated Collection of Antique Greek Gems of the late Prince Poniatowski, in the Collection of Mr. Samuel Sharp. 1857.

On a Sterling of Marie D'Artois, (A.D. 1337 to 1358.) *Numismatic Chronicle*, 1862.

Evidences of the Antiquity of Man. *Northampton Mercury, December* 20, 1862.

Notes upon some Roman Remains recently discovered at Dallington. *Reports and Papers of Associated Societies*, 1862.

Notes upon some Northamptonshire Antiquities, including Roman Remains recently discovered at Dallington. *Northampton Mercury, October* 11, 1862.

On the Bones at Rothwell. *Northampton Mercury, June* 7, 1862.

A few Interesting Geological Facts. *Northampton Mercury, February* 1, 1862.

[On a] Sterling of Henry VII., Emperor of Germany, of the Méraude Mint, (A.D. 1308–1314.) *Numismatic Chronicle*, 1862.

A Few Remarks on the Coinage of the Ancient Britons, including a Notice of a Silver Coin of the British Chieftain Tasciovanus, found at Gayton, in 1863. *Northampton Mercury, October* 17, 1863.

The New Town Hall. [A Poem, signed] Laicus. *Northampton Herald, May* 21, 1864.

Dallington, its History and its Church. *Northampton Mercury, February* 20, 1864.

Antique Counterfeits and Counterfeit Antiques. *Reports and Papers of Associated Societies*, 1865.

A Paper on the Early Moneys of this Country, including an Account of the Anglo-Saxon Mint of Stamford. 1868. *Northampton Herald, October* 17, 1868.

A Remarkable Incrustation in Northamptonshire. A Paper read before the British Association, Section C., at Norwich, Aug. 22, 1868. *Northampton Mercury, August* 29, 1868.

On a Remarkable Incrustation in Northamptonshire. *Geological Magazine, December* 1868.

Notes on the Northampton Oolites. *Geological Magazine, October*, 1869.

The Stamford Mint. *London*, 1869.

Roman Coins found in Surface Soil, Ironstone Pits, Duston, near Northampton. *London*, 1869.

"On the Oolites of Northamptonshire." *Abstracts of the Proceedings of the Geological Society of London, March*, 1870.

The Oolites of Northamptonshire. *Quarterly Journal of Geological Society, August*, 1870.

"On the Oolites of Northamptonshire." (Part II.) *Abstracts of the Proceedings of the Geological Society of London, February*, 1873.

The Oolites of Northamptonshire. (Part II.) *Quarterly Journal of Geological Society, May*, 1873.

On Roman Remains found at Duston. *London*, 1871.

Note on a futile search for Coal, near Northampton. *Geological Magazine, November*, 1871.

Earthen Coin Moulds found at Duston, near Northampton. *Numismatic Chronicle*, 1871.

The Moabite Stone. *For Private Circulation. Northampton*, 1872.

Sketch of the Geology of Northamptonshire. Written expressly for F. Whellan & Co.'s History and Topography of the County. Published 1873.

Sketch of the Geology of Northamptonshire. *Proceedings of the Geologists' Association, Oct.*, 1874.

Historical Notes of Dallington, with an Account of its Church. *Reports and Papers of Associated Societies*, 1875.

Rudiments of Geology. *London*, 1875.

Rudiments of Geology. Second Edition. *London*, 1876.

The Geology of the Nene Valley. *Northampton Mercury, Sep.* 2, 1876.

Observations on the Limits of the British Town of Cassivelaunus, within which St. Albans now stands. By Mr. Samuel Sharp, Communicated through Mr. James Yates, F.R.S. *Archæological Journal*, vol. xxi., p. 333.

Notices of Vestiges near St. Albans, supposed to indicate the site of the British Town of Cassivelaunus. Communicated through Mr. James Yates, F.R.S., by Mr. Samuel Sharp. *Archæological Journal*, vol. xx., p. 299.

Genealogical Notes of some Families connected with Northamptonshire, and in particular with Great Harrowden. 1880. *Lincoln.*

The Stamford Mint. Supplement. *Numismatic Chronicle*, N.S., vol. xx., 1880.

[Forthcoming] Papers on the Ancient Castle of Northampton, in the *Journal of the Associated Societies.*

## MEETINGS.

The Annual Meeting was held at the Guildhall, on Tuesday Evening, March 7th, when there was a good attendance. The Rev. S. J. W. Sanders, M.A., LL.M., Vice-President, presided, and read the following report :—

In presenting to you this our Sixth Annual Report, your Committee have again the pleasure to note the continued progress of the Society. We regret, however, that the addition to our numbers since our last annual meeting has been but small; only twelve new members have been elected, and we have lost nearly that number from various causes. The following papers have been read during the past year :—February 17, Mr. W. R. Wells, on "Sense and Perception in Animals;" March 24, Mr. B. Thompson, on "The Liassic and Oolitic Rocks of Northampton;" December 18, Sir H. Wake, on "Some Curiosities of Natural History;" December 2, Mr. J. Eunson, on "The Boring for Water on the Kettering Road;" December 15, Mr. F. T. Mott, on "The Botany of Fruits." Besides these papers there have been other meetings, at which various objects of interest have been exhibited and described. Our excursions have been neither so numerous nor so well attended as we should wish. We mention two which were fairly well attended and well enjoyed—the one to King's Cliffe and Collyweston, and the other to Olney and Yardley Chase. We have issued the eighth quarterly number of our journal, thus completing its first volume, and the first number of the new volume will shortly be in the hands of the members. We only say of it, that it is a journal of which we may well be proud, and for which we must tender our most hearty thanks to all those who have assisted in its production. We have another matter for congratulation in the success which has attended our efforts to bring science home to the people of our town. The Gilchrist Lectures have been well attended by large and appreciative audiences, and the four lectures already given have been very admirably adapted for the purpose of interesting the general public in their subjects. At the first one the Town Hall was filled; at the second it was filled to overflowing; at the third the Mission Hall was filled with some 1,300 people. We have no doubt the two still to be given will be equally successful. We hope these lectures will attain the end for which they were intended, and interest the workman class in the sciences which tend so much to educate and elevate them. We deeply deplore to record the death of one of our corresponding members, Mr. S. Sharp, F.S.A., F.G.S. He was an unwearied, methodical, and clear-sighted worker, and has produced records which will be of historical value in the future history of this county, not only in the various departments of Natural History, but also in the (to him) especially congenial study of antiquarian research and architecture.

The Chairman made some remarks upon the report, after which Mr. Bailey moved the adoption of the report, which was seconded by Mr. Rush, and adopted. Mr. Sidney Law gave the report of the Library Committee, and Mr. Bailey presented his report as Treasurer, showing a balance on the right side of about £7. Mr. Crick resigning the secretaryship, Mr. T. L. Cordeux, Mr. S. J. Newman, and Mr. H. J. Eunson were elected joint secretaries. The other officers were re-elected. Rev. S. Wathen Wigg moved a vote of thanks to the officers for their services, and suggested that Saturday evening lectures to working men should be tried. Mr. W. Tomalin seconded, and laid special emphasis on the services rendered to the Society by Mr. W. E. Crick. It was put to the vote, and heartily carried.

The formal business having been transacted, Mr. W. D. Crick proceeded to read a paper, to which reference is made in an extract from *Nature*, to be found above. The thanks of the Society were voted to Mr. Crick for his remarks, which were illustrated by some very neatly-mounted specimens. Mr. W. Tomalin afterwards called attention to a case of Birds—admirable specimens of the buzzard family, comprising all the varieties to be found in this country.

A Meeting of the Microscopical Section was held in the Curator's Room of the Town Hall, on Thursday evening, January 26th, Mr. A. Kempson in the chair. There was a good attendance of members, including Messrs. Bingley, Durham, Law, W. D. Crick, C. E. Crick, Boddington, W. R. Wells, H. W. Parker, Osborn, S. J. Newman, H. J. Eunson, &c. Mr. Gregory then proceeded to explain the manner of mounting objects for the microscope in a way that showed him to be a complete master of the art. He first of all spoke of the necessity of thoroughly cleaning the slide, and then practically illustrated the mode of building up the cells for the reception of the objects by means of various glues, etc. He also treated of the different media for mounting. Mr. Gregory's remarks were listened to with much interest, and a most hearty vote of thanks was given him, on the proposition of the Chairman, who urged all those members not possessing a microscope to immediately procure one, assuring them, from his own experience, that it would prove a source of instruction and amusement. Mr. Gregory exhibited a number of mounted objects. Mr. G. Osborne showed under his microscope a section of a cat's tongue. Previous to the above meeting the members of the Botanical section met, and selected the following officers: President, Rev. M. J. Berkeley, F.L.S.; Secretary, Mr. C. E. Crick. On the suggestion of Mr. E. A. Durham, it was decided to meet fortnightly, and at each meeting to take one order of plants, Mr. C. E. Crick to commence with a paper on the *Ranunculaceæ*.

## PHENOLOGICAL OBSERVATIONS.

| 1882. | | | |
|---|---|---|---|
| Jan. | 4 | Gorse in blossom ... ... | Ulex europœus |
| | | Aconite, Daisy } in garden ... ... | |
| | | Berberis in flower ... ... | Berberis vulgaris |
| Jan. | 9 | Daisy ... ... ... ... | Bellis perennis |
| | | Lesser Periwinkle ... ... | Vinca minor—very early. |
| | | White Dead-nettle ... ... | Lamium album |
| | | Primrose in garden ... ... | Primula vulgaris |
| | | Groundsel ... ... ... | Senecio vulgaris |
| | | Whitlow grass ... ... ... | Draba verna |
| | | Robin singing ... ... ... | |
| Jan. | 14 | Partridges pairing ... ... | |
| | 16 | Thrush singing ... ... ... | |
| | 20 | Chickweed in flower ... ... | Stellaria media |
| | | Shepherd's Purse ... ... | Capsella bursa-pastoris |
| | 21 | Snowdrops out ... ... ... | Galanthus nivalis |
| Jan. | 23 | Lark singing a few notes ... | |
| | | Hive bees out ... ... ... | |
| | | Wallflower in blossom ... ... | Cheiranthus cheiri |
| | | Elder in leaf ... ... ... | Sambucus niger |
| Jan. | 29 | Larks in full song ... ... | |
| Feb. | 1 | Mercury in flower ... ... | Mercurialis perennis |
| | 4 | Catkins on hazel in flower ... | Corylus avellan |
| | 10 | Lesser Celandine ... ... | Ranunculus ficuria |
| | | Red Dead-nettle... ... ... | Lamium purpureum |
| | | [Near Abington and Weston Favell.] | |
| Feb. | 18 | Wild Gooseberry in leaf ... | Ribes grossularia |
| | | Wild Rose in leaf ... ... | Rosa canina |
| Feb. | 19 | Blackthorn in leaf . ... | Prunus spinosa |
| | | Ladybirds out [near Dallington.] | |
| Feb. | 21 | Pistillate flowers on hazel ... | Corylus avelland |
| | 22 | Hawthorn in full leaf ... ... | Cratægus oxyacantha |
| | | [Near Wellingborough.] | |
| Feb. | 24 | Primrose ... ... ... ... | Primula vulgaris |
| | | [Harrold Park Wood, Bedfordshire, but close on borders.] | |
| | | Coltsfoot in flower ... ... | Tussilago farfara |
| | | Dandelion ... ... ... | Leonto-don taraxacum |
| | | Blackthorn in leaf ... ... | |

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|---|---|---|
| 1882. | | |
| Feb. 28 | Damson in blossom ... ... | |
| Mar. 9 | Bats flying about ... ... | |
| 11 | Violets in full bloom ... ... | Viola odorata |
| 12 | Hawthorn bush in full leaf ... | |
| | Sulphur Butterfly ... ... | |
| 16 | Tortoiseshell Butterfly ... ... | |
| | Wood Anemone in flower ... | Anemone nemorosa |
| | Barren Strawberry ... ... | Potentilla fragariastrum |
| | [Harrold Park Wood.] | |
| 17 | Blackthorn in blossom ... ... | |
| 18 | Tortoiseshell Butterfly ... | |
| 23 | Buds on Maréchal Niel Rose ... | |
| 24 | Wild Plum in blossom ... ... | |
| | Hawthorn flower buds ... ... | |
| | Ground Joy in flower ... ... | Nepeta glechomá |
| 30 | Cowslip in flower ... ... | Primula veris |
| April 4 | Marsh Marigold ... ... ... | Caltha palustris |
| | [Hinwick—borders of Bedfordshire.] | |
| 4 | Oxlip ... ... ... ... | Primula elatior |
| | [Harrold Park Wood.] | |
| 6 | Greater Stitchwort ... ... | Stellaria holostea |
| | Wild Hyacinth ... ... ... | Hyacinthus nonscriptus |
| | Dog Violet ... ... ... | Viola canina |
| 7 | Goldilocks ... ... ... | Ranunculus auricomus |
| | Germander Speedwell ... ... | Veronica chamœdrys |
| 9 | Jack by the Hedge ... ... | Sisymbrium alliaria |
| | Common Buttercup ... ... | Ranunculus bulbosus |
| | White Butterfly ... ... ... | |
| 11 | Dovesfoot Cranesbill ... ... | Geranium molle |
| | Cuckoo flower—[Hinwick] ... | Cardamine pratensis |
| | Early Purple Orchis ... ... | Orchis mascula |
| | [Harrold Park Wood.] | |
| 11 | Rue-leaved Saxifrage ... ... | Saxifraga tridactylites |
| 11 | Wild Cherry—[Hinwick] ... | Prunus cerasus |
| | Wild Pear— ,, ... | Pyrus communis |
| 14 | Wild Apple Blossom ... ... | Pyrus malus |

MARGARET E. KEEP,

Wollaston.

## LEPIDOPTERA.

In accordance with the suggestion of the President of the Entomological Section (Sir Herewald Wake) a list has been compiled of the different species found in the County. This laborious work has been undertaken by Mr. W. Hull and Mr. H. F. Tomalin. They have carefully examined all the private collections in the County of which they have been informed, and have made their list, which is already in the hands of the Editors. Its publication will be begun in the next number, but as it is important that it should be as complete as possible, members of this Society who know of the capture of any rare specimens, should at once communicate their observations to the authors.

# MIDLAND UNION OF NATURAL HISTORY SOCIETIES.

## NOTTINGHAM MEETING, JUNE 15TH, 1882.

[*Reprinted from the "Midland Naturalist."*]

The Fifth Annual Meeting of the Union was held in the University College, Nottingham, on Thursday, the 15th of June. The Council of the Union assembled at half-past Twelve, when delegates were present representing fourteen Societies. Various Reports were received and considered; the Nottingham G. R. S. Naturalists' Society was formally admitted to the Union; and the invitation from Tamworth, to meet there in 1883, was accepted.

The Annual General Meeting was held in the Lecture Theatre of the College, at Three o'clock, the President of the Union (Dr. Appleby Stephenson) in the chair. Among those present at the Council Meeting and General Meeting, were Messrs. H. R. Hind and C. O'Sullivan (Burton-on-Trent), S. J. Newman and C. E. Crick (Northampton), C. T. Musson and B. S. Dodd (Nottingham Naturalists' Society), Rev. O. M. Feilden (Oswestry), Rev. Provost Warmoll and F. W. Crick (Bedford), F. T. Mott and Geo. Hull (Leicester), Horace Pearce (Stourbridge), J. Levick (Birmingham), E. D. de Hamel (Hon. Treasurer), Dr. Colin Campbell and T. Cooke (Tamworth), G. B. Rothera and Rev. Dr. Dixon (Nottingham L. & P. Society), Dr. A. C. Taylor, C. Wheatley, Dr. White, Dr. Ransom, Rev. J. F. McCallan, J. P. Briscoe, W. Rigby, C. Perry, J. T. Jepson, N. Allen, H. Blandy, E. G. Gordon, E. M. Kidd, &c., and the Hon. Secs. of the Union, W. J. Harrison (Birmingham) and E. Wilson (Nottingham).

The minutes of the Cheltenham Meeting of June 16th, 1881, having been read and confirmed, the PRESIDENT delivered his Address.

### ADDRESS BY APPLEBY STEPHENSON, ESQ., M.D.,

PRESIDENT OF THE UNION.

I cannot for a moment justify my appearance in this distinguished position, but at least I can explain it. I owe it entirely to the fact—not of any special fitness or suitability, and certainly of no desire—but simply to the accidental circumstance that for two consecutive years I was President of the "Literary and Philosophical Society of Nottingham," and so by "natural selection" it would seem it came to me. Yet in justification of myself I am bound to tell you I accepted this post of honour under pressure and under protest. I can only see one advantage that will accrue—my predecessors will by this contrast derive additional distinction and lustre, and 'twill be far easier for any successor to succeed me than I now feel it to take the place of those that are past. Still, I must not be wanting in gratitude—if in gratulation—and must remember that the most important duty which devolves upon me, as President of your Union, is the delivery of an address at this, the annual meeting. In considering my incapacity

to properly fulfil such a task—certainly to my own satisfaction—I am reminded of, though I cannot emulate, the poet Campbell's ready wit when in a seeming dilemma. A young lady presented her album to him with the request that he "would write something *original* in it," on which he at once penned these lines:

"An 'original something,'
Fair maid, you would woo me
To write;
But how shall I begin?
For I fear I have nothing original in me
Excepting original sin!"

However, it only remains for me to execute my task to the best of my ability, and, if I do not further dispraise myself, it is because to do so would be to find fault with those who have placed me here.

I have thought my best course to take would be a brief notice of the special naturalistic peculiarities of this district, and on such I shall mainly address you.

## INTRODUCTION.

The Union started with 17 Societies (January, 1878); the present number in the Union is 25. The Subscription for the first two years, was 1d. per member, but this has since been raised (May, 1879) to 3d. per member. The present number of members in the Union is nearly 3,000.

Among the advantages of the Union may be named the manner in which it has brought the various Midland Societies more closely together. In the first list issued by the projectors of the Union (January, 1877) only 13 Societies are named, and several of these are wrongly designated. The Annual Meetings have caused many acquaintances to be formed among scientific workers in the Midlands. Five vols. of *The Midland Naturalist* have been issued, which will form a permanent record of the work done by the various Societies.

The Darwin Prize was founded 1881; and the first award was to a Nottingham geologist—E. Wilson, Esq., F.G.S. Mr. Darwin has always taken an interest in the Union, and was a subscriber from the first to its organ, *The Midland Naturalist*.

I shall now offer a few remarks, first on "General Geology" and the "Glacial Drift Deposits," for the sake of referring to the work which has been done by some of our members, and shall follow these by more extended notices of "The Geology of the Nottingham District," the "Mollusca" of the county, its "Ornithology" and "Botany."

## GENERAL GEOLOGY.

The work of the Geological Survey must not be considered as final, but only as indicating the lines for local research. Mr. Shipman has made important corrections and additions in the Nottingham district. Professor Lapworth and Mr. F. T. S. Houghton have shown that the quartzite of the Lower Lickey Hills, near Bromsgrove, is not

of Llandovery age, for which it was mapped by the Government Survey, but that it is immensely older, belonging to the Lower Cambrian formation. A patch of Llandovery sandstone rests, at one point, against the quartzite. Mr. W. J. Harrison has found that the rocks of Dosthill, in the North of Warwickshire, mapped as "Greenstone" by the Survey, are really fossiliferous Cambrian shales, traversed by dykes of diorite; the same geologist has shown, in conjunction with Prof. Lapworth, that the Hartshill quartzite, which forms a ridge between Nuneaton and Atherstone, is, together with a mass of overlying shaly beds, also of Cambrian age, being the equivalent of the Lickey rock.

## GLACIAL DRIFT DEPOSITS.

Little progress has been made with this subject, the complexity and difficulty of which becomes yearly more apparent. Mr. Harrison has furnished Mr. Searles V. Wood with a number of observations made by himself on the drift of Leicestershire, and he has used these in his paper on the "Newer Pliocene Period in England," read before the Geological Society of London, and published in their journal (vol. 36, p. 457). In a paper Mr. Harrison lately read before the Philosophical Society of Birmingham, on the "Quartzite Pebbles in the Drift," he endeavours to show that these are derived firstly from the Bunter Conglomerate of the Trias. The latter bed is itself derived from an old Palæozoic ridge which stretched across Central England; and not from the Old Red Conglomerate of Scotland, as the usually accepted theory put forth originally by Prof. E. Hull would have us believe.

The question of the nature and origin of the Glacial Deposits is so wide and so difficult, that, for purposes of individual research, it is well to subdivide it. The quartzite pebbles form an easily recognisable division, and now that they have been shown to be fossiliferous, their study will prove highly interesting.

## THE GEOLOGY OF THE NOTTINGHAM DISTRICT.

The rocks of Nottinghamshire though generally devoid of palæontological interest—fossils as a rule being conspicuous by their absence—are yet of interest from the important evidence they furnish as to the stratigraphical relationships of the lower Mesozoic to the upper Palæozoic formations. Exclusive of the post-Tertiary rocks, viz., glacial and alluvial clays, sands, and gravels, the rocks of Nottinghamshire naturally fall into two groups of easterly-dipping formations—the Carboniferous and the post-Carboniferous—which are separated from each other by a clearly defined unconformability,—an unconformity that is proved by the changing strike of the outcropping coal measures, and by the constantly increasing depth beneath the base of the Permian rocks of particular coal seams going east from the Magnesian Limestone escarpment on the borders of Notts and Derbyshire, and which may be seen in surface exposures at Kimberley, five miles west of Nottingham.

*The Coal Measures.*—The only Carboniferous formations represented in Notts occupy but a small surface area on the western borders of the county, but without doubt underlie the newer rocks of the whole of the county, except perhaps in its southern extremity. The coal measures of Notts are of very great economic importance from the large and constantly increasing supplies of fossil fuel that are drawn from them, and they are destined to become of even greater importance in the future. The fossils of this series are almost entirely limited to the ordinary coal measure plants and mollusca, though scanty fish remains, a fossil scorpion and one or two limuloid and other crustacea, have been found.

*The Permian Formation.*—The lowest of the post-Carboniferous formations consists of the following sub-divisions:—Marl Slates with breccia at base, Lower Magnesian Limestone, Middle Permian Marls and Sandstone, Upper Magnesian Limestone and Upper Permian Marls. The last two divisions are, however, scarcely seen in the county. The limestone is largely quarried for building purposes, yielding a rough-hewn stone well adapted for outer walls, and is also burnt for lime, while the marls are manufactured into bricks and pottery. The magnesian limestone, which dies out finally near Nottingham on the south, from its uniform durability has come to form a very evident dip slope from the high ground overlooking the Derbyshire coalfield on the west to where it becomes covered by Triassic rocks on the east. For further information on these rocks, including some interesting speculations as to their probable origin, I must refer you to the paper by Mr. E. Wilson, F.G.S., "On the Permian Rocks of the North-east of England," published in last year's *Midland Naturalist*, for which the first Darwin Medal has been awarded.

Next above the Permian rocks and separated from them by a slight but still perceptible unconformity comes the Triassic series, the rocks of which, striking nearly due north and south, occupy the major portion of the county. The Lower Division, or Bunter Sandstone, is represented by the Lower Mottled Sandstone and the Pebble Beds. The Lower Mottled Sandstone yields moulding sand for the iron furnaces. It is well exposed at Mansfield, and at several points in the Leen Valley. The Pebble Beds are finely shown in the cliff-like eminence on which Nottingham Castle stands. The Bunter Sandstone occupies a considerable area in North Notts, comprising much of the region once occupied by Sherwood Forest. Being a porous sandstone, resting on impervious strata, it forms an excellent natural reservoir for water supply. Its dryness also well adapts it as a site for building purposes. Being comparatively soft and easily hewn, dwelling places were hollowed out in it by the ancient inhabitants of the country. Hence the earliest Saxon settlers termed the place Suodena-gabam (the home of caves). The rock beneath the town is honeycombed by extensive cellars and long passages. At Snienton Hermitage some of the caves are still

faced with doors and windows and inhabited, and the "Park holes" bear traces of a primitive kind of sculpture. Beneath Nottingham Castle are extensive dungeons, and the bold escarpment in front is traversed from top to bottom by a tortuous subterranean passage known as Mortimer's Hole. The Upper Trias or Keuper series is represented by three subdivisions—the Basement Beds, the Waterstones, and the Red Marl. The Basement Beds, a fluctuating series of red and white coarse sandstones, are only well shown in Stapleford Hill and the Hemlock Stone, but have been temporarily exposed on the east side of Nottingham. The Waterstones consist of alternating porous sandstones and red marls. They are exposed at several points on the east side of the town. Both these rocks have in past times been quarried for building purposes, and may be seen in several old walls and buildings. The Red Marl is a series of bright red clays with a few thin beds of hard white sandstone, with veins and sometimes thick beds of gypsum. The Red Marl and also the clays of the Waterstones have for long past been extensively worked for bricks on the high ground east of the town, and Nottingham may truthfully be said to have once lain on Mapperley Plains. The Triassic series is almost entirely destitute of fossil organisms. The Bunter Sandstone yields nothing excepting the occasional fossiliferous quartzite pebbles which have been derived from metamorphosed Silurian rocks. From the uppermost gypsiferous beds of the Red Marls a suite of Foraminifera have been described by Messrs. Parker and Jones, from Chellaston Hill (Derbyshire), but as these were not actually found *in situ* a certain amount of doubt appears to hang over their authenticity as Triassic—a doubt that it would be satisfactory to see cleared up. A few fish scales have been found at Newark, annelid tracks occur now and then; a Cheirotherium footprint was found some years ago by Mr. Irving at Colwick, and lately Mr. Wilson came upon quite a shoal of fishes in a seam of marl at the very base of the Waterstones in Colwick Wood. Above the Triassic rocks come the Rhætic beds, a thin series of dark-coloured shales which help to connect the Trias with the Lias. The outcrop of these beds strikes north and south and N.E. and S.W. across the county, from Gainsborough to Newark, and thence by Elton and Stanton-on-the Wold into Leicestershire—and is often indicated by a low level topped escarpment. Exposures of the Rhætics are rare, but they may be seen in the gypsum pits at Newark-on-Trent, and there is a very good exposure at Gainsborough.

Last of all comes the Lias. The lower Lias limestones and shales only are represented in Notts. They crown the high ground in the south of the county which runs from Bunny to Cropwell Wolds, and stretch thence to the Vale of Belvoir. The blue lias limestone is worked for cement at Barnston. A detailed account of the Lias would belong rather to the geology of Leicestershire than of Notts. The excursion to-morrow to Belvoir Castle under the able leadership of Professor Blake, will give the members of this Association an opportunity of examining these rocks in that county.

Glacial drift occurs in several places, usually as thin patches of sand and gravel, but does not as a rule attain a sufficient thickness to seriously modify the nature of the soil. The high ground extending from Robin Hood's Hills through Annesley Park is thickly covered with drift. Near Blidworth are large isolated masses of cemented drift gravel. On the high ground, six miles south of Nottingham, where the Lias comes in, there is a great accumulation of Boulder Clay, which at Stanton-on-the-Wolds attains a thickness of sixty feet or more, and is largely constructed from the grinding down of the Lias, Rhætic, and Keuper shales of the district, but contains erratics which have come from considerable distances.

The floor of the valley of the Trent, which has in this district an average width of about two miles, is occupied by alluvial deposits of gravel and sand, about twenty feet in thickness on the average, with a top crust of alluvial silt or mud or a peaty soil a foot or two in thickness. The Leen valley is occupied by a narrow fringe of similar deposits, as also are some of the smaller brooks and a rather extensive alluvial flat formed of stiff dark clay, known as Bingham Moors, lies on the south-east side of the district.

## MOLLUSCA.

In Mollusca the district is fairly well represented. We have recorded 100 species in the county of Notts out of about 130 British species.

We find that Nottinghamshire mainly consists of Triassic and Permian rocks, together with Oolitic Boulder Clays and Alluvium to a smaller extent, the soil not being particularly rich in carbonate of lime. The land species are pretty equally distributed over these different formations, the sandy districts being least prolific of life in these forms, whilst the Magnesium Limestone districts are the richest.

Of the freshwater species the greater number are to be found in the river valleys, the canals being richest in point of numbers, comparatively few species being found in the ponds above the river levels. Many of our best localities for rare species have disappeared through the march of improvements or trade enterprise; notably in the case of a pond at Barton, where once was found a rare bivalve (*Sphærium lacustre*); there are now none at all, on account of enlarging the pond and the consequent destruction of the species. In the same way some of our best botanical hunting grounds are lost to us. Linley Wood is closed; Bulwell Bogs are gradually disappearing, owing to the encroachments of a railway; and a pond at Wollaton, in which once grew in profusion the beautiful water violet (*Hottonia palustris*), has now disappeared, and in its place is a hideous shale heap deposit from a neighbouring colliery.

Amongst our locally rarer species of shells may be noted:—
Sphærium lacustre (var. Bronchiana). In Clumber Lake.
Sphærium ovale. Canal at Beeston.

**Planorbis lineatus**, Highfield House lake (E. J. Lowe), the furthest recorded northern locality.

**Limnæa glutinosa**. Found at Beeston Rylands by Mr. Lowe some years ago, but not lately found in the district.

**Ancylus lacustris**. At Beeston, on the stems and leaves of aquatic plants.

**Testacella haliotidea**. Introduced. Found at Welbeck Abbey.

**Helix revelata**. Stanton-on-the-Wolds (E. J. Lowe). The only recorded inland locality, being generally found near the sea coast.

**Helix fusca**. Highfield House (Lowe). Rare.

„ **sericea** „ „ „

„ **lapicida**. Pleasley Vale and Creswell Crags; also dead specimens at Halloughton; very plentiful on the rocks at Castleton and in Dove Dale.

**Pupa secale**. Nottingham Castle (Lowe).

„ **ringens**. Highfield House (Lowe).

**Clausilia laminata**. One dead specimen at Pleasley Common; at Matlock and Crich Hill.

**Achatina acicula**. Plentiful in rejectamenta of a small stream at Tollert n; also found at Colwick, Attenborough, and Highfield House.

**Cochlicopa tridens**. Pleasley Vale, rare; and plentiful amongst moss at Belper.

**Balia perversa**. Rare, Colwick and Highfield House.

**Vertigo pygmæa**. Rare, Widmerpool and Wollaton.

There are some peculiarities with respect to habitat that are interesting to geologists. Some kinds of freshwater univalves have the faculty of enduring a partial change or difference in their usual habitat which would be fatal to other kinds. Nilsson, the Swedish naturalist, relates that two species of *Limnæa* described by him, as well as *Neritina fluviatilis*, live in the Baltic, adhering to sea-weeds, and sometimes at a distance from the mouth of any river. With these live certain marine mollusca, such as the common mussel and cockle, mya arenaria, and Tellina Balthica. Limnæa is Pulmonobranch, and Neritina is Pectinibranch. The same peculiarity has been observed in the case of a freshwater bivalve, though not of so permanent a character.*

The common pond mussel (Anodonta cygnea) is said to live in the River Trent, which is salt at high water. The fresh water, being lighter, forms the upper stratum, while the sea water covers the bed of the river inhabited by the Anodonta.

Dreissena polymorpha (a kind of mussel which abounds in many of our rivers and canals) M. Marcel de Serres is of opinion was originally marine, from the circumstance of the shells being found in tertiary strata of marine formation. The Russian traveller Pallas (who first discovered or made known this species) described one variety of it as marine, and the other as inhabiting fresh water.

* Jeffreys, vol. 1, chap. vi. (ci.)

Planorbis corneus, a well-known and widely-distributed fresh water snail. Lister tried in vain to fix the purple dye yielded by this species in such quantity.

Monstrosities, or abnormal forms of the Mollusca in this district have been rarely observed, particularly so among the land Mollusca.

Hellix, during repairing season, are furnished with *crystalline darts*, which they shoot at one another. These curious *love weapons* have been observed sticking to the bodies of snails after such conflicts. They are contained in a special pouch or receptacle ready for use. In some species each individual has only one of these missiles, in others two, and a few species have none at all. They are not often observed by conchologists.

## ORNITHOLOGY.

Nottinghamshire, from its diversity of character, is rich in the variety of its feathered tribes. Here are vast tracts of cultivated land giving support to those species which thrive and increase on the fruits of man's labour; there is also a large area of wood and waste almost in its primitive condition, harbouring other species, which invariably retire before the encroachments of the axe and plough; many large ponds or lakes, fed by rivulets, giving an asylum to aquatic birds, and the great river Trent, attracting not only the various ducks and waders, the denizens of fresh water, but also those of marine origin, many of which appear to migrate from the south-western coast, following the course of the Severn and Trent to the eastern shores in the spring or early summer, and returning westward in the autumn; three or four kinds of sea gull, three terns, and the green cormorant may be included in this category.

Referring to the green cormorant, a remarkable circumstance occurred two or three years since, during an autumnal gale. A flight of these birds, not being able to make headway against the strong westerly wind, alighted on the tops of various high buildings in the town, and in this situation several were shot by city gunners.

Amongst the rare birds procured in the neighbourhood may be mentioned the Rough-legged Buzzard, a winter visitor, the Peregrine Falcon, Osprey, Great Grey Shrike, Hoopoe, Bee-eater, Redneck Phalarope, Squacco Heron, Spotted Crake, Redneck Grebe, Little Bittern, White-fronted Goose, Lesser Tern, and others. The ornithologist has in the county an opportunity of making acquaintance with the major part of the list of British birds, over 200 species being known, either resident or visiting this locality.

## BOTANY.

The Flora is such as is found in moist meadow-land and woodland, and upon sandstone and Magnesian Limestone. No alpine or subalpine plants. The flora is a numerous one. In the county are found of flowering plants 836 species belonging to 189 genera, and of flowerless plants 302 species belonging to 87 genera, that is, altogether, 1,138

species belonging to 276 genera. Amongst rare plants may be mentioned: *Crocus vernalis*, the Spring Crocus, and *Crocus nudiflorus*, the Autumn Crocus. These have become for at least two centuries naturalised in the Nottingham meadows, and when in flower make such a show as can be seen nowhere else in Britain. Acre upon acre of meadow is so thickly covered that the green appearance of the fields is changed to a most lovely blue purple. Since building has encroached upon the meadow-land, however, the crocus is dying out. The only other locality in England where the crocus is found wild is at Mendham, Suffolk.

*Vinca major* and *minor*, the greater and less Periwinkle, found near Colwick, near Farnsfield, and in Kirklington Wood. *Paris quadrifolia*, Herb Paris, found in Colwick Wood, at Aspley, and in Linby Wood. *Parnassia Palustris*, Grass of Parnassus, in a close beyond Scottum, (*Scotholme* now), in bog land near Bulwell, &c. *Silene nutans*, the Nottingham catch-fly. This is found on the Castle Rock, and upon rocks at Sneinton. A variety is found upon Dover Cliffs. The Castle Rock is remarkable for the very large number of plants to be found upon it, many being of a somewhat rare description.

Amongst distinguished botanists who have written upon or collected the county flora may be mentioned Deering. He published "Catalogus Stirpium: a catalogue of plants naturally growing and commonly cultivated in divers parts of England, more especially about Nottingham. Distribution according to Mr. Ray. By C. Deering, M.D., Nottingham. Printed for the author by G. Ayscough, and sold by Rivington at the Bible and Crown, St. Paul's Churchyard, London, 1738." He refers (as to a newly-ascertained fact) to the dilatation produced in the pupil of the eye by application of a bit of leaf of *Atropa Belladonna*. In naming some habitats of plants, he refers to the Castle Rock, the Park, the Hell-closes by the Leen, the Nottingham Gallows; and names some plants that are now extinct in this neighbourhood, as the *Nymphæa alba*, or White Water Lily, which he states is found in "the great Cheney Pool, and in a ditch between Lenton and Beeston. He describes as a new plant, *Solanum tuberosum esculentum*, *Battatos*, of late much cultivated, and turned to good account."

Ordoyno wrote "Flora Nottinghamiensis: T. Ordoyno, nurseryman and seedsman, Newark, 1807," dedicated to a botanist, Mrs. Sherbrooke, of Oxton. He mentions the fact of Dr. Smith acknowledging in his Flora Britannica," the receipt of the Crocus from the above-named lady.

Howitt wrote "The Nottinghamshire Flora: containing the Flowering Plants, Ferns, Mosses, Hepaticæ, Lichens, Characeæ, and Algæ: By Godfrey Howitt, M.D., London, 1839," a small, but invaluable work, embracing the facts as to local distribution observed by Deering, Ordoyno, Jowett, and himself. Jowett was a collector (and writer ?). Lowe, of Beeston High Fields, wrote "A History of British

Grasses," and also "Ferns, British and Exotic," both profusely illustrated, and the latter work an authority on the subject. Dr. Mitchell made a large collection of dried plants, now in the Museum of the University College. Lastly, Dr. Wilson largely verified Howitt's book, and collected a nearly complete County Flora. This collection is the finest we have in the town; many of the specimens are quite remarkable for the beautiful preservation of the colours. An attempt is being made to make of this collection a Flora Britannica, but there are many gaps to fill up.

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At a meeting like this, composed largely of workers in natural history, it is impossible not to refer to the great naturalist who has recently departed from us, Charles R. Darwin. Always more or less an invalid, but ever an incessant worker, he had the good fortune to live to see his famous theory of evolution almost universally adopted—an anti-evolutionist being now as rare as an evolutionist once was. His modesty, justice, and fairness to others were proverbial. He was the intellectual parent of hundreds, and his burial at Westminster was a great testimonial to the growth of liberal thought among our clerics. In the future, Darwin must rank among the world's foremost truth-seekers, after Plato and Cicero, and as the greatest man of science England has produced since Newton.

Three duties now alone remain for me. In the first place, I must thank several gentlemen who have aided me in the preparation of this address, including Dr. Truman and Messrs. E. Wilson, B. S. Dodd, J. S. Hedderley, and W. J. Harrison. Then I wish to offer the warmest of welcomes to those visitors from the various scientific societies of the Midlands who have honoured and gratified us by their presence here to-day; and, lastly, I desire to express my personal obligations to this audience for the patience and courteous attention with which they have favoured me.

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Mr. E. D. DE HAMEL proposed, Mr. H. PEARCE F.L.S., F.G.S., seconded, and it was unanimously resolved "That the thanks of this Meeting be given to Appleby Stephenson, Esq., M.D., for his able and interesting Address, and that it be printed in the *Midland Naturalist*."

Mr. W. J. HARRISON then read the

## REPORT OF THE COUNCIL.

The history of the Union during the past year has been a comparatively uneventful one. No society has seceded, and but one additional society—the Nottingham G. R. S. Naturalists' Society—has been admitted to the Union. The name of the Derbyshire Naturalists' Society has been removed from the following list, since it appears to have ceased to exist. The total number of Societies in the Union is now twenty-five, including—

Banburyshire Natural History Society.
Bedfordshire Natural History Society and Field Club.
Birmingham Microscopists' and Naturalists' Union.
Birmingham Natural History and Microscopical Society.

Birmingham Philosophical Society.
Birmingham and Midland Institute Scientific Society.
Birmingham School Natural History Society.
Burton-on-Trent Natural History and Archæological Society.
Caradoc Field Club.
Cheltenham Natural Science Society.
Dudley and Midland Geological and Scientific Society and Field Club
Evesham Field Naturalists' Club.
Leicester Literary and Philosophical Society.
Northamptonshire Natural History Society.
Nottingham Literary and Philosophical Society.
Nottingham Naturalists' Society.
Nottingham Working Men's Naturalists' Society.
Nottingham G. R. S. Naturalists' Society.
Oswestry and Welshpool Naturalists' Field Club.
Oxfordshire Natural History Society.
Peterborough Natural History and Scientific Society.
Severn Valley Naturalists' Field Club.
Shropshire Archæological and Natural History Society.
Stroud Natural History Society.
Tamworth Natural History, Geological, and Antiquarian Society.

It is impossible to give here a complete resumé of the work done by each Society during the year, interesting as such a record would be, partly because of the length to which it would extend, and partly because of the failure of the Secretaries of many of the Societies to furnish any particulars whatever of the work of their Society. The post of Hon. Secretary of a local Natural History or Literary Society is one which involves a great deal of trouble without much recompense, but it should certainly be considered as entailing on the holder the necessity of writing a reply after not less than, say, *three* applications from the governing body of the Union to which the said Local Secretary's Society is supposed to belong. A full account of the position, number of members, officers, and general or detailed work of each Society in the Union, was, however, given in the last Report, and has been published in the *Midland Naturalist*.

All, or nearly all, the Societies belonging to the Midland Union have held field meetings during the summer, when practical botanical, zoological, or geological work was carried out. Probably much more might be done at these field meetings if they were carried out on some definite plan, with some definite objects, and if the aid of experts (whose expenses should, of course, be defrayed) could be secured, to give short, practical demonstrations.

During the winter evenings, lectures, and the exhibition and explanation of specimens, with an occasional conversazione, have continued and supplemented the work of the summer months. Here again, an interchange of lectures would be beneficial in many ways; the Council would request that all gentlemen who are willing to read papers, or give lectures, should send in their names to the Hon. Sec. of the Union, who would keep a register of them and communicate a list to the local Secretaries.

By five or six of the Societies the evening lectures have been organized so as to form a course on some branch of Natural History; or such a connected course, of a simple and elementary character, has been given in addition to the regular evening meetings of the Society; in this manner courses on Geology have been delivered to the Geological Section of the Birmingham Natural History

Society, and to the Evesham Field Club, a course on the Invertebrata to the Cheltenham Natural Science Society, etc. The success of these courses depends largely on their being couched in clear and simple language, and on their being well illustrated by specimens, diagrams, and the microscope; it is not necessary, indeed it is almost impossible, that the whole of the course should be given by one person; but by six or eight members joining together the toil is lessened while the sum of the knowledge given forth remains the same.

The Council notice with approval a plan for the encouragement of field-work, which has been adopted by the Northamptonshire Naturalists' Society. Each working member is provided with a card, stating that the bearer is a member of the Society, and that permission has been given by the landowners of the district (whose names are printed on the card) to pass over and examine their demesnes for scientific purposes. The Council think that this plan might be more generally adopted, as keepers and others naturally look with suspicion upon casual visitors.

*Botany.*—Two local floras are preparing for publication; Mr. Bagnall's *Flora of Warwickshire* has been appearing for some time in the pages of the *Midland Naturalist*. If a sufficient number of subscribers can be obtained it is proposed to publish this valuable work in a separate form; it will constitute a volume of about 450 pages.

The *Flora of Leicestershire* is being prepared by a Committee of the Leicester Literary and Philosophical Society, mainly under the direction of Mr. F. T. Mott. It is impossible to value too highly the publication of carefully prepared local lists, such as these two books will be. They will not only throw light on many botanical problems of great interest, but they will furnish an aid to local workers and give a stimulus to local work, which should cause us to prize them highly. It is much to be desired that a flora of each county within the limits of the Midland Union should be carefully worked out.

*Geology.*—The problem of the Glacial drift continues to prove itself one of the most difficult questions in geology. Probably local workers will do better to attack it piece-meal, or by sections, rather than to attempt its consideration as a whole at once. The existence, dimensions, &c., of large boulders is a point of great interest, and one which it is comparatively simple and easy to work out.

During the year the quartzite pebbles which form so remarkable a feature in the drift between the Thames Valley on the south and the Pennine Range on the north, have been in part investigated;* they have been found to be, to some extent, fossiliferous and to be derived from the Bunter Conglomerate, which latter formation is derived from a ridge of old land which extended from the Malverns to Charnwood Forest. Vestiges of this old land occur not only in Charnwood and the Malverns, but in the Hartshill Range of Warwickshire, and the Lickey Hills of Worcestershire; rocks of Cambrian and Pre-Cambrian age have quite recently been detected in both these localities; rocks which had been wrongly mapped by the Geological Survey as Upper Silurians, Millstone Grit, and even as coal measures! It is most clear that the Government map should be very closely scrutinized and regarded with a "healthy scepticism" instead of the implicit acceptance with with it has hitherto been received. The neighbourhood of

* "On the Quartzite Pebbles found in the Drift and in the Trias of the Midlands, and on their probable derivation." By W. Jerome Harrison, F.G.S. in the Proceedings of the Birmingham Philosophical Society, Vol. II.

Nottingham has shown the same thing; the able and long continued researches of Mr. James Shipman having enabled him to correct in many points the work of the Survey, and to construct the large-scale geological map of the town and neighbourhood which is exhibited at this meeting.

Although in other branches of science less marked discoveries have been made, yet the progress has been satisfactory. In Entomology many beetles new to the Midlands, and one or two species which are probably new altogether, have been found by Mr. W. G. Blatch.

The organ of the Union—*The Midland Naturalist*—has been issued with regularity during the year, and has maintained the high place in local scientific literature which it assumed on the appearance of the first number. It cannot be doubted that in future years the value of perfect sets of *The Midland Naturalist* to all scientific workers in the Midlands will be very great. It is greatly to be regretted that this Journal is not better supported by the members of the societies whose official organ it purports to be; the army of grumblers is very large, but the number of those who render active aid of any kind is very small, and the whole burden devolves, and has devolved from the beginning, upon a few willing shoulders. The more important papers published during the year include "The Desmidieæ of North Wales," by *A. W. Wills*, "Flora of Warwickshire," by *J. E. Bagnall*, "Entomological Rambles," by *W. G. Blatch*, "Minerals of the Midlands," by *C. J. Woodward*, "Meteorology of the Months," by *C. L. Wragge*, "The Permian Formation," by *E. Wilson*, "Ancient Inhabitants of the Cotswolds," by *H. Bird*, "A Nest-building Fish," by *Silvanus Wilkins*, "Migratory Birds," by *O. V. Aplin*, "The Archæan Rocks," by *Dr. C. Callaway*, "The Goldfinch," by *H. A. Macpherson*, "Fresh-water Aquaria," by *R. M. Lloyd*, "Study of Fungi," by *Dr. M. C. Cooke*, "Birds of Leicestershire," by *T. Macaulay*, "Note on *Bopyrus Squillarum*," by *W. R. Hughes*, "Report on *Pennatulida*," by the *Messrs. Marshall*, "The *Myxomycetes*," by *W. B. Grove*, "Beavers and the Bute Beavery," by *E. D. De Hamel*, "Derbyshire Land and Freshwater Shells," by *Rev. H. Milnes*, &c., &c. Mr. W. J. Harrison has written several reviews of scientific works for the Magazine.

*Darwin Prize.*—The award of the first Darwin Medal was made known at the fourth annual meeting of the Union, at Cheltenham, in 1881. The medal could not be presented at that meeting, as the dies were not ready, but the delay is not to be regretted, since, as the medal was won by a Nottingham geologist—Mr. E. Wilson, F.G.S., —there is a peculiar appropriateness in its actual presentation to that gentleman taking place at the present meeting.

The subject of the Darwin Prize for 1882 was Biology. This subject is such an extremely wide and comprehensive one, and the difficulty of comparing papers on botanical subjects with papers on zoological questions is so great, that it has been decided to separate the subject of Biology into the two branches of Zoology and Botany, and to make each of these the subject for a year's work. The Darwin Medal will, therefore, be awarded in

1882 for Zoology,
1883 ,, Archæology,
1884 ,, Botany,
1885 ,, Geology.

It has also been decided that all papers shall be eligible for the medal which have been sent in for publication in the *Midland Naturalist* since

the expiration of the last term for which a medal was awarded for the same subject. For example, any paper on Geology received between March 31st, 1881, and March 31st, 1885, will be considered in awarding the Darwin Medal for 1885.

At a meeting of the Management Committee of the Union, held in the Room of the Natural History and Microscopical Society, at Mason College, Birmingham, the following gentlemen were requested to act as adjudicators of the Darwin Medal for 1882:—

Prof. T. W. Bridge, M.A.
H. J. Carter, Esq., F.R.S.
Dr. Spencer Cobbold, F.R.S.
Rev. W. Houghton, F.L.S.
G. B. Rothera, Esq.

and Mr. W. J. Harrison, F.G.S., was requested to act as Secretary to the adjudicators.

The Council has received from Mr. Harrison the following report:—

REPORT OF THE ADJUDICATORS OF THE DARWIN MEDAL, 1882.

The adjudicators have great pleasure in awarding the Darwin Gold Medal for Zoology to Prof. A. M. Marshall, M.A., M.D., D.Sc., and W. P. Marshall, M.I.C.E., for their paper on the "Pennatulida," now appearing in the magazine which is the organ of the Union—*The Midland Naturalist*.

Each adjudicator made a searching and minute enquiry into the work submitted for their consideration, and the following extracts from their individual reports will indicate the care and thought bestowed by them upon the matter.

DR. SPENCER COBBOLD, F.R.S., writes:—"Considering the work done, I deemed it only fair that a prolonged and careful scrutiny should be made. I assign to the paper on the "Pennatulida," by Prof. A. M. Marshall, 100 marks. From the plan I have adopted it will be understood that the acquisition of 100 marks implies that this memoir is regarded by me as a practically, if not an absolutely, perfect paper of its kind."

H. J. CARTER, Esq., F.R.S., remarks:—"As to the "Pennatulida" paper by the Messrs. Marshall, this, in point of arrangement, description, and illustration, is a very excellent and instructive contribution.

Prof. T. W. BRIDGE, M.A., states that "The paper by Prof. Marshall and Mr. W. P. Marshall on the "Pennatulida" is an able, admirably illustrated paper, and contains several important additions to our knowledge of an interesting, but comparatively little-known group of animal forms. After quoting Kölliker's scheme for the classification of the group, the authors give (1) a brief general account of the species, (2) an anatomical description, which includes an account of the mechanical properties of the skeleton, the anatomy and histology of the cœnenchyma and polypes, and the polymorphism of the zooids. Reference is then made to the other existing species of Funiculina, and the paper concludes with a discussion of the zoological position and affinities, the history and literature, the geographical distribution of the genus, with a brief note on specimens in the various English Museums. The paper is an exceedingly complete and useful compilation of the salient features in the anatomy, histology, geographical distribution, and affinities of a rare and interesting "Pennatulid."

The beautiful plates accompanying the letterpress are original; moreover they are of considerable value, inasmuch as they supplement the incomplete and often inaccurate figures given by Kölliker in his classical work on the "Pennatulida." The paper also proves that *Funiculina quadrangularis* is not confined to the Mediterranean Sea and Scandinavia, as stated by Verrill and Gray, but is to be also regarded as a Scotch species. I regard the authors of this paper as fully deserving the award of the Darwin Medal."

The Rev. W. Houghton, F.L.S., etc., believes "that the Darwin Medal, bestowed annually, is doing much to promote investigation and observation among the members of the Midland Union of Natural History Societies." He adds that "the paper on the "Pennatulida" is a valuable contribution to our knowledge, and displays an excellent method of scientific treatment."

G. B. Rothera, Esq., places Professor Marshall's paper "in the rank of those which serve to illustrate more completely the methods and aims of science, by tracing out the evolution of the organism and its relation to its environment: of this paper (on the "Pennatulida") it would be almost impossible to speak in terms of too high praise, and I consider it in every sense deserving of the Darwin Medal."

The Council, therefore, recommend that the Darwin Medal for Zoology (1882) be awarded to the Messrs. Marshall, and they congratulate the members upon the reception of so valuable a contribution to zoological literature as the paper on the *Pennatulida* to which the Gold Medal has been awarded.

The death of the famous naturalist after whom the Darwin Prize was named, must be recorded here in terms of the deepest regret. Mr. Darwin strongly approved of the scheme of the Midland Union, and was one of the first subscribers to the *Midland Naturalist*. He entirely approved of the scheme according to which the Darwin Prize was to be awarded, and expressed great pleasure at its establishment. Your Council believe that the permanent endowment of the Darwin Prize and Medal would form a most fitting memorial of this great naturalist, who may fitly be called "The Shakespeare of Science." If we despair at his loss, knowing that "none but himself could be his parallel," we may be comforted by reflecting that "he was not for an age, but for all time," for he has left us in his books a monument of insight and patient research which will aid and encourage every subsequent worker in the field of natural science. The sum required to endow the Darwin Medal would be about £250, and for such an object it is believed this sum could be readily raised. The Societies in large towns might each give a conversazione for this object, at which the work of Darwin should be specially illustrated, and the funds derived from the sale of admission tickets be devoted to the "Darwin Memorial" here proposed.

*The Mason Science College, Birmingham.*—Allusion has been made to this valuable institution in each of the last two reports of the Council. It is gratifying to learn that the number of students continues to show a regular and rapid increase, the number on the books for the present term being 197. The Medical Students of the Queen's College, Birmingham, now receive their scientific training in Chemistry, Physiology, and Botany, at the Mason College, an arrangement which is greatly to the advantage of both Institutions.

Mr. Hillhouse, B.A., of Cambridge, has been appointed Professor of Botany, and the class in this subject has made an excellent start.

Professor Lapworth has established a practical class for Geology, and has, with great kindness, invited Birmingham geologists to join in the Saturday afternoon excursions made by this Class.

The Scientific Library possessed by the Mason College now numbers over 10,000 volumes of the best books in all departments of science; it is greatly indebted to the fostering care of Dr. Heslop.

Both the Birmingham Philosophical Society and the Birmingham Natural History and Microscopical Society are housed in the Mason College, to the mutual advantage of these Societies and the Institution.

*Birmingham Free Library.*—The Reference Department will be opened in the new buildings on June 26th. Lists of the best books in every branch of science have been furnished (at the request of the Committee) by local experts in science, and were presented through the Birmingham Natural History and Microscopical Society. No provincial library will contain a more complete set of valuable scientific publications. This work has been earnestly promoted by Mr. E. Tonks, B.C.L., who was the first President of the Midland Union.

*Science Teaching in Elementary Schools.*—The practical teaching of elementary science continues to be most successfully carried on in 56 departments (28 Boys' and 28 Girls' Schools) of the Schools under the Birmingham School Board.* A Central Laboratory and Lecture Room is in course of erection, which will enable the work to be carried on more perfectly; 2,000 children and 200 pupil-teachers now receive these science-lessons in Birmingham, and it cannot be doubted that in future years they will furnish a strong contingent of members to the ranks of the local scientific societies. Your Council record, with pleasure, a recent donation of £200 by the famous firm of Tangye Brothers (Messrs. R. and G. Tangye) to the Birmingham School Board for the purpose of establishing science scholarships. An examination for eight science scholarships has recently been held by Professor Poynting, of the Mason College, and in his report on the papers worked the examiner states that, "The answers, as a whole, speak very highly for the carefulness and accuracy of the teaching which the boys have received. Hardly any of the questions could be answered without independent thought on the part of the candidates, and I had very few answers show a want of such thought. The boys showed that they had seen and understood the experiments which they described; that they had been taught to reason for themselves upon them, and that they were not merely using forms of words which they had learned without attaching physical ideas to them." The trustees of Mason College have placed six free exhibitions at the disposal of the School Board, and the two first boys in the above examination will go for a time to the King Edward's School, Birmingham, and afterwards to the Mason College, also receiving £25 per annum for their maintenance. The next six boys receive Scholarships of £10 per annum with free tuition in science; prizes of scientific books are awarded to those who stand next in merit.

The Council note the appearance during the past year of a list* of the local Scientific and Literary Societies of England, classified according to their counties, and including about 190 names. The Midland Union includes only the central counties; if similar associations were formed for (1) the six northern counties, (2) the eastern and south-eastern counties, and (3) the southern and south-western

* For a full account of the system pursued see a paper by Mr. W. J. Harrison in the Proceedings of the Birmingham Philosophical Society, Vol. II., p. 274.

counties, it cannot be doubted that the organisation would result in much good. A Yearly Conference of the officers of these four divisions might be held, with a general Congress of the members (say) every five (or ten) years.

The following list of Scientific Societies in the Midlands which do *not* as yet belong to the Midland Union, is taken from the work referred to above. It is greatly to be desired that all the Societies whose members do real work in science, as distinguished from those which are "Popular Lecture" Societies only, should be welded into one homogeneous whole, so as to "keep touch" with one another, and mutually aid and encourage one another.

*List of Societies in the Midlands which do not belong to the Union.*

DERBYSHIRE.—Chesterfield and Derby Institute of Engineers.
LEICESTERSHIRE.—Scientific Association of Leicester.
Loughborough Literary and Philosophical Society.
HERTFORDSHIRE.—Watford Natural History Society, and Herts Field Club.
HEREFORDSHIRE.—The Woolhope Field Club.
CAMBRIDGESHIRE.—Cambridge Field Naturalists' Club and Entomological Society.
Cambridge Natural Science Club.
BUCKS.—High Wycombe Natural History Society.
BERKSHIRE.—Wellington College Natural Science Society.
Newbury District Field Club.
Reading Microscopical Society.
WARWICKSHIRE.—Smallheath Literary and Scientific Society.
Warwickshire Natural History and Archæological Society.
Warwickshire Natural History and Archæological Field Club.
Rugby School Natural History Society.
Leamington Philosophical Society.
WORCESTERSHIRE.—Worcestershire Natural History Society.
Worcestershire Natural History Field Club.
Malvern Field Club.

In accordance with a suggestion made last year, application has been made to certain of the railway companies to extend to naturalists the privileges afforded to members of fishing clubs, of travelling to certain localities, and on half-holidays, at cheap rates. This application has hitherto not been successful, the difficulty being that the botanist or geologist does not usually carry about with him so much cumbrous apparatus as the angler, so that, while the errand of the latter is pretty plain to the booking clerk, there is no similar surety for the nature of the trip of the man of science; but, besides this, several other difficulties presented themselves.

The time of the Annual Meeting has hitherto been necessarily taken up with business relating to the establishment and organization of the Union. At future meetings it may be possible to arrange for the reading of short papers describing any important work done by members of the Union during the past year.

An invitation to the Union to meet at Tamworth, in 1883, has been received from the Tamworth Natural History, Geological, and Antiquarian Society, and the Council recommend its acceptance, feeling sure that the central position of the town, the attractive nature of the

* In the "Geology of the Counties of England and of North and South Wales," by W. Jerome Harrison, F.G.S. (London, Kelly and Co.)

neighbourhood, and the well-known energy of the members of the Local Society will ensure a successful and well-attended meeting. The Council recommended that Mr. W. G. Davy, of Tamworth, and Mr. W. Jerome Harrison, F.G.S., of Birmingham, be appointed General Honorary Secretaries for the ensuing year.

It was resolved, on the motion of the President, seconded by the Rev. J. F. McCallan, that the report be received, adopted, and printed in the *Midland Naturalist*.

## PRESENTATION OF THE DARWIN MEDAL FOR 1881.

The PRESIDENT, in handing the Darwin Medal to Mr. Edward Wilson, F.G.S., said that it was no slight honour to have one's name associated with that of Charles Darwin. This was the first medal that had been awarded by the Union, and he was very proud to think that it had been won by a Nottingham geologist.

A vote of thanks to the adjudicators of the Darwin Medal was moved by Mr. J. P. Briscoe, seconded by Mr. W. Rigby, carried, and acknowledged by Mr. G. B. Rothera. A vote of thanks was also passed to Sir Herewald Wake, Bart., for his renewal of his offer of a prize for Entomology.

Mr. W. J. HARRISON proposed, and it was resolved, "that a copy of the Darwin Medal be presented to the family of the late Charles Darwin." It was stated that the dies for the Medal had been most admirably executed by Mr. Joseph Moore, of Birmingham; it bore on one side a bas-relief bust of Darwin, and on the reverse a branch of coral, emblematic of one of the greatest researches of the deceased naturalist.

Mr. E. D. de Hamel (hon. treasurer) next read his statement of accounts, from which it appeared that the receipts for the past year amounted to £27 13s. 11d., which, with a balance from the preceding year of £33 2s. 4d., made a total of £60 16s. 3d.; the expenditure amounted to £55 5s. 7d., leaving a balance of £5 0s. 8d. Subscriptions, however, were still due from four Societies, amounting to £7 7s. 7d. For the Darwin Medal Die Fund a sum of £14 2s. 6d. had been either received or promised, the cost of the dies being £15.

It was resolved that the Treasurer's accounts be received, accepted, and entered on the minutes.

Mr. W. J. Harrison (Birmingham), and Mr. W. G. Davy (Tamworth), were elected Hon. Secretaries, and Mr. Egbert de Hamel, Hon. Treasurer.

The thanks of the meeting were given to the officers of the Union for their services during the past year; to the officers and members of the Nottingham Literary and Philosophical Society, Naturalists' Society, Working Men's Naturalists' Society, and G. R. S. Naturalists' Society, for the very complete and admirable arrangements made by them for the present gathering; and to the President of the Union (Dr. A. Stephenson) for his able and courteous conduct in the chair.

## VISIT TO THE HEMLOCK STONE.

In the morning Mr. J. J. H. Teall, M.A., F.G.S., accompanied a party of visitors to the remarkable pillar of rock on Stapleford Hill, known as the Hemlock Stone. This rock is formed out of the Keuper Basement Beds, and, although the Government Geological Surveyor (Professor Hull) would assign its origin to the action of the sea, yet there can be no reasonable doubt but that it has been sculptured out by atmospheric denudation.

## VISITS TO LOCAL INSTITUTIONS, FACTORIES, &c.

Few towns have advanced so rapidly as Nottingham has done during the last few years. The members of the Midland Union viewed with admiration the splendid Art Museum, which now occupies Nottingham Castle, and over which they were conducted by the able curator, Mr. Wallis. The School of Art is fitly housed near the Arboretum—a beautifully laid out public garden, belonging to the town. But the University College—a grand pile of buildings, having the Natural History Museum on one side, and the Free Library on the other—was considered the crowning-point of all. This fine Institution is supported at a total cost to the rates of about £6,000 per annum, but there can be no doubt that it will turn out the best investment ever made by the public-spirited inhabitants of Nottingham. Many members visited one or other of the lace factories, and received ideas as to the complexity and perfection of the machinery employed which they will never forget.

## THE CONVERSAZIONE.

The evening meeting was held in the Large Room and Lecture Hall of the Mechanics' Institute. The local scientists and naturalists had taken great pains to collect a most extensive and interesting series of specimens illustrating nearly every branch of natural science; the members of the local soirée committee, too, must have worked extremely hard to display the objects in so satisfactory a manner The principal exhibitors were:—Mr. N. Allen, entomological specimens; Mr. T. S. Bavin, section and cores of the boring for coal at South Scarle, Lincolnshire; Mr. F. Clements, historical maps, charts, &c., of Nottingham, illustrations of book "From whence Nottingham Sprang," antique brass clock, case of relics; Mrs. Cowen, fossils from the chalk and greensand formations; Mr. E. S. Cowen, photographs of antiquities near Nottingham, drawings of vibration curves, drawings of tesselated pavement, at Barton, Notts; Mr. P. J. Cropper, collection of fossils; Mr. B. S. Dodd, marine algæ, hydrozoa, British and European mollusca; Mr. W. J. Harrison, F.G.S., fossils in quartzite pebbles, specimens of Cambrian rocks from Dosthill and Hartshill, in Warwickshire; Mr. J. S. Hedderley, drawings of British wild flowers; Mr. F. Jackson, geological specimens, antique bronzes, Roman plaque; Mr. A. L. Kohn, minerals and rocks of Auvergne, Central France, sketches of extinct volcanoes, scientific worthies; Mr. L. Lee, cases of mounted specimens of mammals, birds, &c., with some skeletons of the same; Mr. J. Marriott, Lias fossils of Leicestershire; Mr. C. T. Musson, local land and fresh-water shells, marine shells; Mr. H. Pearce, F.G.S., F.L.S., glacially striated stones, granite boulders, mineral specimens; Mr. C. Perry, local British insects; Mr. G. B. Rothera, orders of insecta, exotic lepidoptera, invertebrata, sponges, sea-pens, corals, starfish, shells, &c., specimens from the Lincolnshire coast (Skegness and Wainfleet), shells from North Devon, rock specimens, pass of Llanberis during the glacial period; Mr. W. Rigby, bird's nests with eggs (local), gums and resins, young crocodile, just hatched, in spirits, crustacea; Messrs. Rose and Son, cases of herons, owls, grebe, fox, and teal, wild ducks, and the osprey in their natural habitats, chimpanzee; Mr. J. Shipman, specimens of the Keuper basement beds of Nottinghamshire, Staffordshire, and Cheshire, fossiliferous pebbles of the Nottingham Bunter sandstone, vegetable remains from the alluvium of the Leen Valley, local geological sections, new geological map of Nottingham; Mr. Louis Simon, half-horse power new noiseless gas engine; the Rev. Edwin Smith, M.A., flint and other implements of the stone age found in the Trent Valley, near Nottingham, fossils

from Cromer, bones and teeth of elephants, &c., beetles (chiefly local), rare British plants, galvanometers, showing currents in living plants and thermo-electric phenomena; Mr. Appleby Stephenson, M.D., Japanese, Indian, and Chinese curiosities, books of autographs, and rare prints; Mr. Stones, case of ferns; Mr. J. J. Harris Teall, M.A., F.G.S., microphotographs of rock sections; Mr. W. E. Thornton, local rock and other geological specimens; Mr. C. H. Torr, New Zealand ferns; Messrs. G. E. Webster and Co., sanitary gas stoves for greenhouses and bedrooms; Mr. E. Wilson, F. G. S., Keuper fishes, Carboniferous fishes, local geological sketches and diagrams, photographs of rock scenery, flake of grey chalk from Channel Tunnel; Mr. D. Wright, stereoscopic gallery, with views of foreign scenery. Microscopes were exhibited by Messrs. H. Blandy, G. E. C. Casey, T. W. Cave, Mrs. Cowen, Messrs. C. E. Crick, R. T. Higham, J. Levick, H. Miller, C. Perry, H. E. Perry, John Rogers, G. B. Rothera, E. Smith, J. Smith, J. J. H. Teall, W. E. Thornton, and J. White.

## THE EXCURSIONS.

Friday, June 16th, was devoted to two excursions, one to the neighbourhood of Castleton, in Derbyshire; the other to Belvoir Castle in North Leicestershire.

The Castleton Party were 70 in number. After a pleasant railway ride through the fine scenery of Derbyshire, Chapel-en-le-Frith was reached at noon precisely. Carriages were in waiting and the party drove eastwards and up-hill till they reached the Windy Knoll quarry, famous for its elastic bitumen, and for the number of bones of the bison, &c., discovered in a fissure in the limestone by Mr. W. Rooke Pennington, a few years ago. Close to this spot is the "Blue John" Cavern, down which the party were conducted by a guide who was very satisfactory in every particular save that he would insist on assigning the origin of the cavern to "volcanic forces"! Every other cavern, he was willing to allow, had been formed by the action of water containing carbonic acid, but not this particular cavern! Glancing at the steep face of Mam Tor, the "shivering mountain," formed of black Yoredale Shales, the party resumed their seats in the vehicles and soon found themselves in the sombre little village of Castleton. After a capital dinner at the Castle Inn, most of the party ascended the precipitous steep on whose summit frowns the ruined Norman donjon called Peveril Castle; others visited the Pennington Museum and its worthy custodian, John Tym, while still others wandered up Cave Dale, or once more ventured into the bowels of the earth by the "Peak Cavern." At half-past five the return to Chapel was made through the grand rocky gorge called the "Winnatts," and after tea a hearty vote of thanks was passed to the leader of the day, Mr. E. Wilson, F.G.S., for the excellent manner in which he had planned and carried out a most pleasurable excursion.

The Belvoir Castle Party were 40 in number, and were under the guidance of Prof. J. F. Blake. Getting out of the train at Elton, the gypsum pits, Keuper marls, and Rhætic beds were examined. Driving to Redmile, the fossiliferous beds of the Lower Lias (*semicostatus* zone) were seen well displayed. At Belvoir, Mr. Ingram showed the magnificent gardens, Prof. Blake lectured on the physiography of the country, and the party were conducted over the Castle. After luncheon at the Peacock Inn, the party drove by Waltham, Stonesby and Eastwell to Stathern Station, examining on the way numerous quarries in the Lincolnshire Limestone and Upper and Middle Lias. Fine weather and beautiful scenery combined to render the Belvoir excursion a complete success.

THE OAKS ON MOREHAY LAWN.

*Printed by permission by the Royal Commission for the Exhibition of 1851 from a photograph by Mr. R. Cawston.*

# TREES OF NORTHAMPTONSHIRE. X.

## The Oaks on Morehay Lawn.

Morehay Lawn, the property of the Earl of Westmorland, is about one-and-a-half miles from Apethorpe, and four miles from Oundle. It is a fine breezy expanse of park-like ground, well wooded, and lying at a considerable elevation above the Nene valley on a ridge of boulder clay, which, as has been already remarked, is admirably suited to the growth of oak timber, though not otherwise naturally fertile.

The oaks, which are the subject of the present notice, are situated in a part of the lawn known locally as "The Oak *Heft*." They are about twenty-five in number, and are perhaps the finest group of old trees in the county, except the oaks on Salcey Lawn. Twelve of them are over twenty feet in circumference at five feet from the ground, and the largest tree, which is the subject of the photograph, measures twenty-eight feet eight inches. A still larger tree existed till some years ago, when it was destroyed by fire. It was large enough to hold five or six persons, seated round a small table, and was the rallying point for the picnic parties which frequently visited the spot. It was on one of these occasions that some careless persons left a fire in or near the tree, which being very dry and inflammable was totally destroyed before any attempt could be made to save it. Nothing now remains but the charred stumps of the spurs in the ground, and one large branch which is too heavy for any one to carry away. This tree was probably the "Westmorland Oak nigh Apthorp" mentioned in Morton's Northamptonshire.

It has been suggested to me that the trees may have been planted by the Druids for purposes connected with their worship, and may have been preserved to the present day by a superstitious veneration attached to the spot. The trees are, however, too irregularly placed to warrant the idea of any artificial arrangement, though they are undoubtedly very ancient. They have more probably been preserved by their secluded situation, and the distance from any firm road for carting, as even now they are difficult of access, except in fine weather.

The photograph was taken on the 29th May, 1882.

R. G. S.

# NOTES ON THE BIRDS OF NORTHAMPTONSHIRE.

By Lord Lilford, F.L.S.

69. Snow-Bunting. *Plectrophanes nivalis.*

I find at p. 427 of Morton's 'Natural History of Northamptonshire,' "The greater py'd Brambling, or Mountain Finch (*Montifringilla calcaribus alaudæ major.*) Two of these were taken in Brixworth Field in November, 1708. They were catch'd in the common Lark-nets together with the Field-Larks; they readily playing about the Looking-Glass Stale in the manner of Larks. Since that I have seen them at least 20 in a flock, in our fields about Oxendon, together with the lesser py'd Brambling, as has been noted above." I have no doubt that the above refers to the Snow-Bunting, though I must confess that our author's "cut" of the *Lesser* "py'd Brambling," save in the matter of the long hind claw, bears as much resemblance to the present species as to the Brambling (*Fringilla montifringilla*), which bird it is, I believe, intended to represent. In a list of birds of the neighbourhood of Stamford, supplied by Mr. A. G. Elliott, whom I have often previously quoted, I find "Snow-Bunting, only a few," without dates or particulars of any sort. Besides the above, the only notices I have of this bird as occurring in Northamptonshire are contained in letters from Lady Mary Thompson and the Rev. R. S. Baker, the former of whom informs me that one of these birds, "in its snowy plumage," was shot by Mr. Henderson near Milton, about 1822-23, whilst Mr. Baker simply says, "Snow-Bunting seen near Hargrave" The present is a species with which I have very little acquaintance in a wild state, having only occasionally met with a few scattered individuals on the summits of a range of hills in Inverness-shire, in the early part of October; but it is a well-known and, in some years, a very abundant autumnal visitor to various parts of England, notably to the Humber District in North Lincolnshire, where, as I am informed by Mr. John Cordeaux, it is often met with in flocks of some hundreds.

From the account of this species given in Yarrell, it appears that there is little doubt that it occasionally breeds in the highlands of Scotland, and the nest and eggs have been found in Shetland; but the true summer home of the Snow-Bunting is still further to the north, in Iceland, Spitzbergen, Novaya Zemla, and the arctic regions of North America, though it also breeds in Norway, Finland, the Faroes, and Northern Siberia. In the few

instances in which, as above mentioned, we met with this bird in the highlands of Inverness-shire, we found it exceedingly tame, running about within a few yards of us, and feeding on the seeds of various grasses which grew by the burn sides: in one instance the bird was so confiding that I nearly caught it with my cap; but this was no doubt caused by the fact that a Merlin was hunting over the moss at the moment when the "Snowflake," as this bird is often called, fluttered up at our feet. The call-note of this species is pleasing and musical, and the male has an agreeable song, which, however, I have only heard from a caged bird. In captivity the Snow-Bunting will eat almost any sort of seed, and generally dies of plethora unless strictly dieted. For a description of the nest and eggs of this species, I must refer my readers to Yarrell and other authors; the usual nesting-places appears to be amongst masses of stones or in crevices of rocks, and the bird has been known to breed in captivity in a hole amongst artificial rock-work.

70. REED-BUNTING. *Emberiza schœniclus.*

This bird is sparingly distributed along our river-valley during the summer, and is well known to our country-people as Reed-Sparrow. In the early spring the cock bird may be seen perched on a tall reed or bush near the water, from which position he constantly repeats his short and monotonous song. All the nests which we have met with were situated on the ground, or the crust formed by the roots of the common reed, and were composed of moss and sedge, with a lining of reed-tops, and sometimes a little hair. The eggs, generally five or six in number, are pale brown, with blotches and irregular streaks of black or very dark brown. I have found a nest with a full complement of eggs as early as March 23rd; but, as a rule, I think the first week in April is about the usual time for these birds to commence sitting. In the autumn the Reed-Bunting, to a certain extent, forsakes its summer haunts, and may be met with in the hedgerows in company with Sparrows and Finches, gleaning from the stubbles, and sometimes frequenting our rick-yards, though a few are still to be found at the reed-beds by the river-side. The principal food of this Bunting consists of various seeds; but, in common with most hard-billed birds, it varies its diet in the summer with grubs and caterpillars. I believe that this species usually rears two, and sometimes three, broods, in a season. I have found young birds, only just able to fly, at the end of August. Though, as I have said, this bird is well known in our neighbourhood as Reed-Sparrow, and the Yellow Bunting as Yellow Hammer, the eggs of both species are almost always called "Writing Lark's" by the birds'-nesting boys of the district; and on one occasion of my meeting a lad with a freshly taken nest of eggs

of the Reed-Bunting, and asking him to what bird they belonged, he replied, "Why, Writing Lark to be sure;" and on my proceeding to ask for a description of this Writing Lark, the ingenious youth gave me a pretty accurate account of the Kingfisher!

I have found the present species common in most parts of Europe which I have visited. Some confusion has been caused by this bird having been occasionally called Black-headed Bunting, a name which belongs more properly to *Euspiza melanocephala*, a species from South-eastern Europe, which has hitherto only been once recorded as having occurred in England.

71. COMMON BUNTING. *Emberiza miliaria.*

Though the above adjective *common* has been long applied to this bird, it is, in fact, as Yarrell says, by no means the most common of our Buntings, and in our part of Northamptonshire is certainly not an abundant species. A few pairs breed with us and remain throughout the year; but I do not think that it is sufficiently well known to have obtained a local name, though in many parts of England it is known as Corn-Bunting or Bunting-Lark; the former of which is a most appropriate designation, as the bird is generally to be found about the fences of our arable land, where in the spring-time it may be seen perched on a tall spray, dusting itself on the cart-roads, fluttering over the young corn with heavy flight and hanging legs, and continually giving forth its tedious and rasping notes, I can hardly call them song. The nest is usually placed on the ground in some thick tuft of grass, sometimes in the growing corn itself; it is a large loosely-built structure of roots and strong bents, with a lining of fine grass and hair. The eggs are generally five or six, of a dirty white, clouded with lilac, streaked and spotted with dark brown, and almost always with irregular lines of the same colour. This Bunting is a very late breeder, and even in Southern Spain, where the species is tediously abundant, I have found fresh eggs as late as the end of May. In winter these buntings flock with other birds about the stubble-fields and rick-yards.

72. YELLOW BUNTING. *Emberiza citrinella.*

The Yellow Hammer is very common with us, and though not, I think, now so abundant as it was some thirty years ago, is a well-known and conspicuous bird, especially from its great partiality for the neighbourhood of roads and foot-paths. The notes of the male Yellow Hammer, though monotonous, are, in our opinion, more pleasing than those of the Reed-Bunting, and a great improvement upon the wearying noise made by the

species last described. This bird sings in fine weather almost throughout the year, and never more cheerily than on a bright frosty morning in mid-winter. The Yellow Hammer is, I think, the most insectivorous of our three commonest Buntings, but, when suitable insects are not to be found, feeds on various seeds, and flocks with other birds in winter at the corn-ricks. The nest is usually placed upon, or close to, the ground in a rough hedge-bottom or shrub-grown bank; but I have once or twice met with it in a bush at the height of a foot or two from the ground, and Yarrell quotes an instance in which a nest was found at an elevation of seven feet among the branches of a broom-plant. Both nests and eggs are too well known to require any description. This species is pretty common, though very local, in certain parts of the northern provinces of Spain in the summer months, but in Andalucia seems to be a rare winter visitor.

73. CIRL BUNTING. *Emberiza cirlus.*

This bird, though resident and by no means uncommon in many localities in some of our southern countries, is comparatively rare north of the Thames; and the only occurrence of the species in Northamptonshire with which I am acquainted, happened on June 29, 1866, on the afternoon of which day, as I was watching my Emus and other birds in the court-yard at Lilford, a fine male Cirl-Bunting flew down from a high elm tree, settling on the ground within a few yards of where I stood, and began feeding on the grain which had been scattered for the Emus, and at which several Sparrows and Chaffinches were already busy. I had this bird in full view for some minutes, as he hopped about and regaled himself, till he was attacked by a Sparrow, and flew up to the tree whence he had come. I listened and watched for him on that and for several succeeding days, but neither heard nor saw him again. In England I have met with the Cirl-Bunting pretty frequently in both North and South Devon, in Hampshire, the Isle of Wight, and once in Oxfordshire. Yarrell states that it is known to have bred in our bordering counties of Buckingham and Warwick; and I have little doubt that it also breeds occasionally in the southern division of Northamptonshire, and only requires looking for. It is a very local bird, somewhat resembling the Yellow Hammer in general habits, but seldom affects the open country, in which that bird is so often to be found, seeming to prefer enclosures, and to have a special liking for high elm trees. I have noticed this last particular both in South Devon and Hampshire. The song of the male differs slightly from that of the Yellow Hammer, but is rather more sibilant, not so prolonged, and easily distinguished. This bird is much less lively and active than the last-named, and is rather dull and heavy in its movements and habits. The food of this species consists of

various seeds and berries, varied during the summer with insects of many kinds. Yarrell says that the young are supplied by the parent birds almost solely with grasshoppers; and in Spain, throughout which country this Bunting is exceedingly common, I have seen the old birds taking moths to their nestlings. The few nests I have met with were all placed on steep banks by the side of a road or foot-way, amongst low bushes and herbage, and were built of moss and grass-stalks, with a lining of cow's hair. The eggs are generally five, white, with a lilac tinge, and thickly spotted and streaked with black or dark brown. I have kept this species in confinement; but it has few attractions as a cage-bird, being, in common with other Buntings, dull, silent, and greedy, and without any remarkable beauty of plumage. This species is common in Algeria, where I found it breeding at some four thousand feet above the sea.

74. CHAFFINCH. *Fringilla cœlebs.*

This is decidedly one of the most abundant birds in our neighbourhood, and is too well known to require a detailed notice at my hands. An interesting account of the reasons for bestowing the epithet "*cœlebs*" on this species will be found in the 9th part of the 4th edition of Yarrell's 'British Birds' (pp. 70, 71); and in reference to the real or supposed separation of the sexes in winter, I may state that, with us, there appears to me to be a great increase in the numbers of our Chaffinches every year at the beginning of the cold weather, and undoubtedly the females at that season seem to form a vast majority, though, as mentioned in the work to which I have just referred, it is possible that some of these supposed females may be young males of the year which have not acquired their full plumage. The Chaffinch is a lively active bird, and his cheery song, though not of high merit, is pleasant, and, comparatively speaking, very powerful. The nest is one of the most beautiful works of the kind to be met with in our country, and altogether I think that this species is deservedly a great favourite. The Chaffinch is more or less abundant over the whole continent of Europe, and is by no means uncommon as a winter visitor to the neighbourhood of Algiers, where, however, a closely allied and beautiful species, *Fringilla spodiogenia*, takes its place as the resident species.

75. BRAMBLING. *Fringilla montifringilla.*

This bird is a pretty regular winter visitor to our district, generally arriving about the middle of October, sometimes in vast numbers, whilst in some seasons it is comparatively scarce; however, it must be a very exceptional year in which more or less of these pretty birds may not be

found amongst the old beech trees in front of the house at Lilford, in the latter part of October, and, in ordinary instances, throughout November and December. The Brambling with us seems to feed almost exclusively on the fallen beech-mast, as long as there is any to be found; but in snow, or very severe frosts, they betake themselves, with other finches, to the stack-yards; we very seldom see them about the open fields. This species is much more shy and wary than the Chaffinch, which in general habits it greatly resembles; the call-note has a certain similarity to the *pink pink* of the latter bird, but is much sharper and quite unmistakable; the song, which I have only heard in the aviaries of the Zoological Gardens, Regent's Park, is a low, somewhat hoarse performance, very truly likened by Yarrell to that of the Greenfinch. This species is not known with certainty to have bred in our country in a wild state, though several instances of its having nested and laid eggs in captivity are recorded. The favourite breeding-places of the Brambling appear to be the birch-forests of the mountainous ranges of Norway and Sweden. A nest from the former country in my possession much resembles that of the Chaffinch, but is larger, and lacks the lichens which are generally used by that bird, being built externally of green moss, with small stripe of birch-bark, and lined with, I believe, human hairs, a little wool, and a few feathers, amongst which latter is one from the breast of the Goshawk. The eggs, five in number, are not to be distinguished in colour and markings from those of the Chaffinch, but are rather more pointed at the smaller end than average eggs of that species. The above-mentioned nest was taken from a birch tree at about twelve feet from the ground. The Brambling is a common winter visitor to the south of Europe, and is well-known at that season in certain parts of Andalucia. I did not meet with it in Algeria. A female of this species came aboard my yacht in November, 1873, in the middle of the Bay of Biscay, about halfway between Ushant and Cape Finisterre. I have kept several of these birds caged; but beyond their beauty, they have few attractions, and I never succeeded in making them really tame or in any degree familiar.

*(To be continued.)*

## WORK TO BE DONE.

ONE of the results of the growth of Provincial Societies for the study of Natural History has been the centralizing of their observations, so that observations of comparatively little importance, in an individual neighbourhood, have been shown to be of great value when collected with others from different neighbourhoods for the sake of comparison. One of these movements has been set on foot by the formation of a Committee, composed of delegates from all the Local Societies in England, to meet annually during the meeting of the British Association, to consider best how the work of investigation may be carried on through the labours of the individual Unions. This Committee met at York in 1881, and has issued a circular, portions of which we here reprint, in order to induce some of our members to help in the undertakings. The Committee meet this year at Southampton, and the Rev. S. J. W. Sanders and Mr. S. J. Newman have been requested to act as delegates from our Society.

### I.—COMMITTEES OF THE BRITISH ASSOCIATION.

The work of the three following Committees is of a character to receive valuable help from Local Scientific Societies. It will be seen that a large number of observers, spread over the whole country, is necessary for carrying on the investigations for which the Committees are appointed.

Attention is therefore called to the objects which these Committees have in view; but, as the limits of this circular do not permit of the insertion of full particulars of the methods of observation employed by the Committees, Societies or individuals willing to assist them should communicate with the Secretaries (whose names and addresses are given), and to whom Reports should be sent.

#### 1.—UNDERGROUND WATERS COMMITTEE.

SEC. :—C. E. DE RANCE, F.G.S., 28, Jermyn Street, London, S.W.

OBJECT.—To investigate the circulation of the Underground Waters in England and Wales, and the quantity and character of the waters supplied to various towns and districts.

Records of the heights of the water in wells, with particulars of the variations of level at different periods, are required, as well as notes on the character of the water, and particulars of the formations from which it is derived.

### 2.—Erratic Block Committee.

Sec. :—Rev. H. W. Crosskey, F.G.S., 28, George Road, Birmingham.

Object.—To record the position, height above the sea, lithological characters, size, and origin of the Erratic Blocks of England, Wales, and Ireland, to report other matters of interest connected with the same, and to take measures for their preservation.

It is obvious that to obtain a record of the boulders of Great Britain and Ireland at all approaching completeness, a large amount of local assistance must be relied on. And as, at the same time, the value of the deductions to be made from the information collected by the Committee depends almost entirely on their investigations covering the whole area under consideration, the Committee are obliged to appeal to local societies and local observers for help.

Boulders are scattered over large districts of the country, particulars concerning them can easily be noted, and as they are continually being destroyed, or removed from their original sites, it is very desirable that records should be obtained as early as possible. By the accumulation of information from all parts of the country, and by its careful arrangement and examination, the Committee hope to arrive at data, which will be of material assistance in the study of the history of the Glacial Period.

### 3.—Underground Temperature Committee.

Sec. :—Prof. J. D. Everett, M.A., D.C.L., F.R.S., Rushmere, Malone Road, Belfast.

Object.—To investigate the rate of interest of Underground Temperature downwards in various localities of dry land and under water.

The Committee undertake the determination of temperature at great depths below the earth's surface, in mines, deep wells, artesian borings, etc. Special thermometers are lent by the Committee to observers.

## II.—INVESTIGATIONS CONDUCTED BY INDIVIDUAL OBSERVERS OR SOCIETIES.

Information relating to the following subjects is collected by the observers or Societies referred to, and further particulars as to the method of observation, etc., will be furnished, on application, by them. The subjects mentioned are all very suitable for investigation by Local Scientific Societies.

## 1.—Rainfall.

G. J. Symons, F.R.S., 62, Camden Square, London, N.W.

The Committee would recommend the publication, locally, of observations extended over a limited area (such as a county), and at frequent intervals, as being very effective in arousing local interest in the subject.

It is suggested that Local Societies should take steps for the encouragement of rainfall observation.

[In our own Society this work is undertaken, as our members already know, by Mr. H. Terry, who will gladly welcome any additions to his staff of observers.]

## 2.—Periodical Natural Phenomena.

Assistant Secretary, Meteorological Society, 30, Great George Street, London, S.W.

Rev. T. A. Preston, M.A., F.L.S., The Green, Marlborough, Wilts.

The appended list of 60 species recommended for observation is a selection from the 100 species of which the list of the Meteorological Society consists. The phenomena to be observed are given in the probable order of occurrence as deduced from the mean of six years' observations. Observers may if they prefer to do so adopt the more extensive list of the Meteorological Society, or they may confine their attention to the 25 species of which the English names are here printed in capitals.

There are at present over 40 observers, who record facts coming under this heading, and it is very desirable that the number should be greatly extended, so that ultimately no part of the country may be without observers.

Observers are referred for further information to the following :—

'Instructions for the Observation of Phenological Phenomena.' London : Williams & Strahan. 1875. Price 6*d*. (Also to be had at the office of the Meteorological Society.)

## 3.—Injurious Insects.

Miss E. A. Ormerod, F.M.S., Dunster Lodge, Spring Grove, Isleworth, Middlesex.

The appearance of any of the Insects in the appended list in unusual numbers, any injuries done by them, and the degree of success which has attended any methods of prevention which have been tried, may be recorded and communicated to Miss Ormerod, by whom this list has been compiled, and who will forward on application forms on which to record observations.

Observers are referred for full information, instructions, and illustrations of the insects, to the following :—

'A Manual of Injurious Insects,' by Eleanor A. Ormerod. London : W. Swan Sonnenschein & Co. 1881. Price 3*s.*

'Notes for Observations of Injurious Insects, by the same, in 'Trans. Watford Nat. His. Soc.' Vol. II., Part 2. London : David Bogue. 1878. Price 1*s.* 6*d.*

'Report of Observations of Injurious Insects during the year 1881,' by the same. London : W. Swan Sonnenschein & Co. 1882. Price 1*s.* 6*d.* Previous Reports have been published under the title of 'Notes of Observations of Injurious Insects.' 1878-81.

*Selected List of Periodical Natural Phenomena, in the probable order of occurrence.*

JANUARY.

Song-thrush (*Turdus musicus*) sg.
Skylark (*Alauda arvensis*) sg.
SNOWDROP *Galanthus nivalis*) fl.
Honey-bee (*Apis mellifica*) ap.

FEBRUARY.

ROOK (*Corvus frugilegus*) builds.
Sweet Violet (*Viola odorata*) fl.
COLTSFOOT (*Tussilago farfara*) fl.
Dog's Mercury (*Mercurialis perennis*) fl.

MARCH.

PILEWORT (*Ranunculus Ficaria*) fl.
Wych-elm (*Ulmus montana*) fl.
DAFFODIL (*Narcissus Pseudo-narcissus*) fl.
Barren Strawberry (*Potentilla Fragariastrum*) fl.
Common Frog (*Rana temporaria*) spawns.
WOOD-ANENOME (*Anemone nemorosa*) fl.
COWSLIP (*Primula veris*) fl.
MARSH-MARIGOLD(*Caltha palustris*) fl.
BLACKTHORN (*Prunus spinosa*) fl.
Small white Butterfly (*Pieris Rapæ*) ap.
Ground-ivy (*Nepeta Glechoma*) fl.
GREATER STITCHWORTH (*Stellaria Holostea*) fl.

APRIL.

Wild Chervil (*Anthriscus sylvestris*) fl.
SWALLOW (*Hirundo rustica*) first seen ; last seen (October).
Cuckoo-flower(*Cardamine pratensis*) fl.
NIGHTINGALE (*Daulius Luscinia*) sg.
CUCKOO (*Cuculus canorus*) first heard.
BLUE-BELL (*Endymion nutans*) fl.
Large white Butterfly (*Pieris Brassicæ*) ap.
Ribwort-plantain (*Plantago Lanceolata*) fl.
Upright Crowfoot (*Ranunculus acris*) fl.
Germander - speedwell (*Veronica Chamædrys*) fl.
HERB-ROBERT (*Geranium Robertinum*) fl.
Bush-vetch (*Vicia sepium*) fl.

### MAY.

Creeping Bugle (*Ajuga reptans*) fl.
MILKWORT (*Polygala vulgaris*) fl.
SWIFT (*Cypselus Apus*) first seen; last seen (August).
Cleavers (*Galium aparine*) fl.
Silver-weed (*Potentilla anserina*) fl.
DUTCH-CLOVER (*Trifolium repens*) fl.
Mouse-ear (*Hieracium pilosella*) fl.
OX-EYE (*Chrysanthemum Leucanthemum*) fl.
Flycatcher (*Muscicapa grisola*) first seen; last seen (August).
Bird's-foot Trefoil (*Lotus corniculatus*) fl.
RED POPPY (*Papaver Rhœas*) fl.
Ragged Robin (*Lychnis Flosculi*) fl.

### JUNE.

YELLOW IRIS (*Iris Pseudacorus*) fl.
Meadow-vetchling (*Lathyrus pratensis*) fl.
Spotted Orchis (*Orchis maculata* fl
Dog-rose (*Rosa canina*) fl
COMMON MALLOW (*Malva sylvestris*) fl.
Hedge-woundwort (*Stachys sylvatica*) fl.
Wild Thyme (*Thymus Serpyllum*) fl.
Broad Willow-herb (*Epilobium montanum*) fl.
Field-thistle (*Carduus arvensis*). fl.
Meadow-sweet (*Spiræ Ulmaria*) fl.
BLACK KNAPWEED (*Centaurea nigra*) fl.
MILFOIL (*Achillea Millefolium*) fl.

### JULY.

Tufted Vetch (*Vicia Cracca*) fl.
Yellow Bedstraw (*Galium verum*) fl.
Ragworth (*Senecio Jacobæa*) fl.
HAIR-BELL (*Campanula rotunndifolia*) fl.

ap.—first appears; fl.—flowers open; sg.—song first heard.

*List of Injurious Insects, observations of which are specially desired.*

### INJURIOUS TO FIELD AND GARDEN CROPS.

1. Silver Y Moth (*Plusia Gamma*).
2. Black Weevil (*Otiorhynchus sulcatus*).
3. Pea Weevil (*Sitones lineatus*).
4. Wire-worm Beetle (*Agriotes lineatus*).
5. Crane Fly (*Tipula oleracea*).
6. Spotted Crane Fly (*Tipula maculosa*).
7. Onion Fly (*Anthomyia cepa-rum*).
8. Celery Fly (*Tephritis Onopordinis*).
9. Carrot Fly (*Psila Rosæ*).
10. Bean Aphis, *Collier* (*Aphis rumicis*).

*To Cabbages and Turnips.*

11. Cabbage Butterfly (*Pieris Brassicæ*).
12. Cabbage Moth (*Mamestra Brassicæ*).
13. Turnip Moth (*Agrotis segetum*).
14. Turnip Fly (*Phyllotreta undulata*).
15. Turnip Sawfly (*Athalia spinarum*).
16. Turnip Aphis (*Aphis Rapæ*).

*To Corn.*

17. Corn Sawfly (*Cephus pygmæus*).
18. Wheat Midge (*Cecidomyia Tritici*).
19. Corn Fly (*Chlorops tæniopus*).
20. Wheat Aphis (*Aphis granaria*).

INJURIOUS TO TIMBER TREES AND FRUIT.

21. Goat Moth (*Cossus ligniperda*).
22. Leopard Moth (*Zeuzera Æsculi*).
23. Lackey Moth (*Bombyx neustria*).
24. Small Ermine Moth (*Yponomeuta padellus*).
25. Magpie Moth (*Abraxas grossulariata*).
26. Apple Weevil (*Anthonomus pomorum*).
27. Pear-tree Slug (*Eriocampa adumbrata*).
28. Gooseberry Sawfly (*Nematis Ribesii*).

*To Pine Trees.*

29. Giant Sirex (*Sirex gigas*).
30. Pine-bud Tortrix (*Retinia turionana*).
31. Fir Weevil (*Hylobius abietis*).
32. Pine Beetle (*Hylurgus piniperda*).

*Observations of any other Insects are also desirable.*

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We have to add that in pursuance of a plan already conceived it is proposed to systematize the observations of Natural Phenomena in our own county, which have been made from time to time by individual observers; and the Rev. S. J. W. Sanders has undertaken the work of Local Secretary. Copies of the above list for each year will be sent to those who are willing to undertake the work of observation, printed so as to give the observers a minimum of trouble. Will those who will undertake this work kindly forward their names to Mr. Sanders as soon as possible?

These observations, when tabulated, will thus form the contribution from our County to the Annual Report of the Meteorological Society.

# MONOGRAPH OF A LIFE HISTORY OF TROCHILIUM APIFORMIS (LINN.),

## WITH A DESCRIPTION OF THE CHARACTERISTIC FEATURES OF THE FAMILY OF THE SESIIDÆ.*

BY H. F. TOMALIN.

If any apology is necessary for the reason which has principally induced me to write this life-history, it is that few people, excepting entomologists, seem to know what a *Hornet Clearwing* is, and that some persons to whom I have shown the moth are still in doubt whether the insect belongs to the order *Hymenoptera*† or *Lepidoptera*.‡

In reference to the position this family holds in the order *Lepidoptera*: *Lepidoptera* are divided into two great divisions, *Rhopalocera* ¶ and *Heterocera*,†† distinctions arising from the shape of their antennæ, the former including all "Butterflies," and the latter all "Moths." This great division of the *Heterocera* is divided into several groups, the family of the *Sesiidæ* belonging to the comparatively small group "*Sphingina*:" this group takes its name from the larvæ of the "Privet Hawk-Moth," *Sphinx ligustri* (LINN.), the larvæ, when in repose, having a fanciful resemblance to the Egyptian Sphinx; the family of the *Sesiidæ* also belongs to that section of the *Lepidoptera* termed *Macro-Lepidoptera*, in contradistinction to the *Micro-Lepidoptera*, these terms alluding to their size.

The *Sesiidæ* are generally small moths, this particular species expanding from nineteen to twenty-two lines; they closely resemble *Hymenoptera* in appearance; the insect in question, together with another member of the same genus *Trochilium Bembeciformis* (HUBNER), the Lunar Hornet Clearwing bears a very striking resemblance to the Hornet *Vespa Crabo* (LINN.,) especially when seen on the wing, so much so that scarcely anyone other than an entomologist would like either to approach or to touch it.

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* Revised from a paper read before the Society May 23, 1882: the life history being prepared from original research.

† Hymenoptera. Gk. *hymen* a membrane, and *ptera*, wings.

‡ Lepidoptera. Gk. *lepis* a scale, and *ptera*, wings.

¶ Rhopalocera. Gk. *rhopalon* a club, and *keras*, a horn (or antenna.)

†† Heterocera. Gk. *heteros*, different.

I once showed several Hornet Clearwings to a friend when on the wing, in a large breeding case, and I had great difficulty in convincing him they were not veritable Hornets, so closely did they resemble this insect.

Other individual species of this family also bear striking resemblances to other insects. *Sesia Ichneumoniformis* (FABR.,) closely resembling certain species of that group of *Hymenoptera* termed *Ichneumonidæ*. *Sesia Tipuliformis* (CLERCK,) the Currant Clearwing is a plentiful species, flying over the tops of currant bushes in the brightest sunlight in June and July. The larvæ live in twigs of currant trees, and may be detected by the slightly drooping leaves.

The family of the *Sesiidæ* range throughout the greater part of Europe and Northern and Western Asia. (See Kirby.) The *Sesiidæ* have the fore-wings mostly transparent, with scales on the margins only. The hind-wings are nearly always transparent. The abdominal segments are seven in number in the male, and six in the female. Their flight is swift. The fore-wings are round at the extremities, and the hind-wings triangular. The neuration of the wings is extremely plain—the discoidal cell being very perceptible; the eyes are large and prominent; the thorax is rather sombre; and the abdomen is banded with showy colours.

Their metamorphoses are complete, appearing in three forms after leaving the egg, *i.e.*, the larva, the pupa, and the imago. They only grow in the larva state, the pupa and the perfectly-developed insect never increasing in size.

They fly rapidly in the sunshine, and may be captured on the wing, or resting on the stems of their food plants. Their larvæ are naked, having a few scattered hairs, and are dirty-white in colour. They live through one or two seasons in the roots and stems of trees, shrubs, and herbs. They change to pupæ in the early spring in a cocoon, composed of the agglutinated fragments of gnawed wood behind the epidermis of the bark of the tree, or shrub, or herb. Their pupæ are provided with transverse rows of spines upon the abdominal segments, by the aid of which they are able to work themselves to the orifice of their borings to emerge as imagines or perfect insects.

Having now concluded the description of the characteristic features of the family, I will, without delay, commence the more important life-history of *Trochilium apiformis*. Shortly after copulation, which lasts for about three hours, the male, as is usual with *Lepidoptera*, dies (the males which bred in my cases lived for six days and the females four days), and between fifteen and sixteen hours afterwards the female commences to lay the eggs to the number of from fifteen to sixteen hundred; they are laid

singly in the interstices of the bark, and are not attached by any glutinous secretion. The eggs are small brown globular bodies covered with a hard shell, and contain the germ of the future larva, together with the nourishment required for its development previous to its emerging from the egg. After a few days the eggs become slightly depressed in the centre, and become gradually darker, and are almost black just before the little larvæ emerge. The period of development is from a fortnight to three weeks, varying with the temperature When the final moment has arrived the larva gnaws its way through the shell, and lives on the shell for the first and part of the second day.

The larvæ are white when first hatched and become gradually darker, and are dirty-white when full-fed. They are naked with the exception of a few scattered hairs, and are partially cylindrical in shape, being flat on the underside. They are rather thinner at the anal extremity than at the head, which is horny and flattened, and the first thoracic segment is covered with a horny plate, and is dark colored the same as the head, which is armed with a pair of horny mandibles. The first three segments are the thoracic segments, and correspond to the thorax of the imago. The larva breathes by spiracles placed on each segment, except the first, third, fourth, and last; they have sixteen legs, which are disposed thus: they have one pair of legs (pedes) upon each of the three thoracic segments, which taper from the base to the extremities, and are the true legs, and correspond to the legs of the perfect insect; they have a pair of pro-legs (pedes coronati) upon the seventh, eighth, ninth, and tenth segments, which are furnished with small hooks directed outwards; and, lastly, they have a pair of legs upon the last segment called "claspers."

I am not able to give the number of times the larva moults owing to the great difficulties of observation attendant upon all internal feeders.

Shortly before the larva commences it last moult, called pupation, and completes its first metamorphosis, namely, into the pupa or second stage of existence from the egg, it prepares a passage or tunnel by which the perfect insect can escape. It does not, however, quite make the passage into the open air; it eats through the outer bark, but leaves the epidermis perfect, which it partly protects by sealing it all over with a glutinous secretion, so that it will yield to the efforts of the pupa from the inside, but not so easily to any enemy from the outer side. The tunnels of the larva, that is the path of exit, are more frequently to be found behind a projecting rib of the bark than on the smoother exterior of the trees. The orifices of these tunnels may be seen after the moth has escaped, from about nine inches above the ground line (which height I have never observed exceeded) to a depth below the ground of from one to three and even five inches,

The larva lives for two years in the roots and lower parts of the trunks of the White or Abele Poplar, *Populus alba* (LINN.,) in particular, living between the last division of the bark and the wood; also, though less frequently, I have found them upon the Balsam Poplar, *Populus balsamifera* (LINN.,) but I have never observed them upon the Black or Lombardy Poplar, *Populus nigra* (LINN.,) though both of these trees were growing beside the Abele Poplars in one locality. Some authors mention the Aspen Poplar, *Populus tremula* (LINN.,) and the Willow, *Salix alba* (LINN.,) as food plants. My experience is, however, the same with these trees as with the Lombardy Poplar—never having observed a single instance of their feeding upon these trees, though I have carefully searched for them.

I mentioned before the manner in which the larva prepares the tunnel for the emergence of the perfect insect; when after having strengthened the epidermis with the secretion it retires down the tunnel, generally about half-an-inch, and there forms a cocoon, composed of gnawed wood, bound together with a glutinous secretion, and in this cocoon, which is constructed in February and March, varying with the season, it remains until the end of April, when it completes the last moult called pupation. The head is turned towards the future orifice for the exit of the perfect insect. These cocoons are generally about one-and-a-quarter inches in length. The pupa is surrounded with a horny skin, and the separate parts of the future moth, such as the eyes, antennæ, legs, proboscis, etc., may be distinctly traced. The pupa breathes by spiracles placed upon each of the abdominal segments, except the first and last. There are spiracles also upon that part of the pupa corresponding to the thoracic segments of the larva. The abdominal segments are armed with transverse rows of short spines, by the aid of which they are able to break through the head of the cocoon, work themselves up the remaining portion of the tunnel, then break through the epidermis of the bark, and partly project from the orifice. In the specimens exhibited this may be clearly seen, though this is partly due to the exertions of the perfect insect to escape from the pupal envelope. Sometimes the pupa drops to the ground, and may be found among the leaves and loose rubbish at the bottom of the tree. (See J. G. Wood's "Common British Moths," p. 16.

A few days before the perfect insect emerges the pupa turns very dark and is less active, apparently collecting its energies for the final struggle to complete the last metamorphosis. Considerable moisture and heat are required by the pupa of this insect for its proper development.

When the moth has emerged its wings soon expand, and it may be found freshly-emerged in the early morning resting on the trunks of the food plants, or may be seen flying in the bright sunlight. Their flight is

very rapid. Their time of appearance on the wing is from ten to twelve o'clock in the morning, and two till four in the afternoon. They appear in the winged state in the latter end of June and July.

The expanse of the fore-wings in this species varies from nineteen to twenty-two lines. The general colour of the body is brownish-black; the head and palpi are orange-coloured. The thorax has a large orange patch on each side in front, and two duller ochre patches on the disc behind. The abdomen has the first and second joints black, except the base of the second which is orange; the third segment orange, with the hind margin black; the fourth entirely dark brown; the fifth and sixth orange also, with the hind margin brown; the remainder orange. The margins of the wings are narrow, and are ochre-brown. The antennæ are dark above, but ferruginous beneath; and the legs orange, varied with tawny.*

Of the localities of this insect in the district which I propose to call—"The Northampton District"—the area of which is included in a radius of from twelve to fifteen miles, not however going beyond the county boundary—I have found this insect on the railway embankment at Blisworth; this is the most western point, from which they range eastwards in a narrow line to Grendon and Yardley Hastings, including the old locality at Denton, from which some years since specimens were obtained by Mr. F. H. Archer. The various localities I have traced along this line were not previously known. Starting from the most eastern point these localities are Grendon, Castle Ashby, Yardley Hastings, near Denton Lodge, Wootton, Milton, and Blisworth railway embankment, the most western point: there is one divergence of about two-and-a-half miles northwards from the direct line, namely, a locality at Abington Park.

The synonymes of this insect having been greatly confused, below will be seen a list of the more important ones taken from Westwood and Humphrey's "Transformation of British Moths." Synonymes, p. 34, Vol. I.

*Trochilium Apiformis.* LINNÆUS. STEPHENS. CURTIS. SCOPOLI. DUNCAN.

*Sphecia Apiformis.* HUBNER.

*Sphinx Crabroniformis.* WIEN VERZ. HUBNER.

*Sphinx Apiformis.* LINNÆUS. DONNOVAN. HAWORTH.

*Sesia Apiformis.* FABRICIUS. LASPEYRES. GODART. OCHSENHEIMER. ZETTERSTEDT DALMAN.

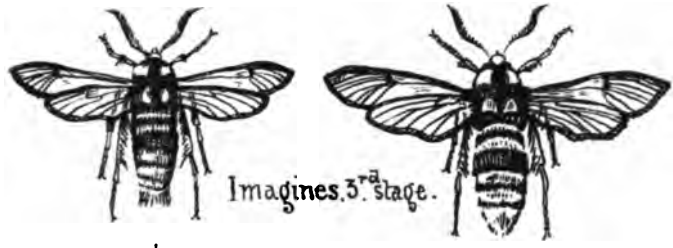
*Ægeria Apiformis.* FABRICIUS. NEWMAN.

The Society is indebted to the kindness of Mr. Wm. Hull for preparing the accompanying plate.

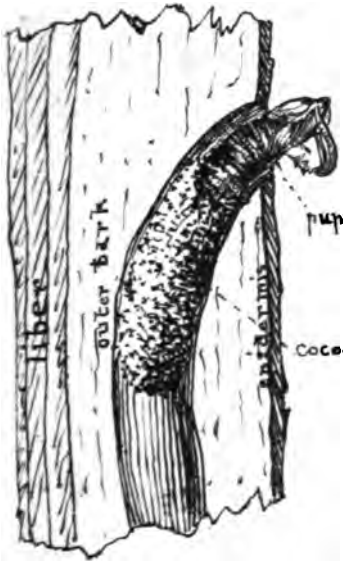
* This description of the perfect Moth is taken from Westwood & Humphrey's "British Moths," vol. i., p. 35.

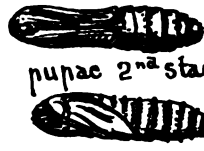
# METAMORPHOSES OF TROCHILIUM APIFORMIS (LIN)

Hornet Clearwing



full fed larvæ 1st stage.



pupae 2na stage.

pupal envelope after emergence.

Cocoon.

ova.

NATURAL SIZE. W.H.

## ORNITHOLOGY.

### Dates of Arrival of our Summer Visitors as observed near Northampton.

1882.

| | | | |
|---|---|---|---|
| March | 23..... | Chiffchaff ... ... | Phylloscopus collybita (Vieillot.) |
| ,, | 28..... | Willow-Wren ... | Phylloscopus trochilus (Linn.) |
| April | 14..... | Sand-Martin ... ... | Cotile riparia (Linn.) |
| ,, | 16..... | Turtle Dove ... ... | Columba turtur (Linn.) |
| ,, | 18..... | Swallow ... ... | Hirundo rustica (Linn.) |
| ,, | 23..... | Greater Whitethroat.. | Sylvia rufa (Boddaert.) |
| ,, | 24..... | Nightingale ... ... | Dalias luscinia (Linn.) |
| ,, | 25..... | Tree-Pipit ... ... | Anthus trivialis (Linn.) |
| ,, | ,, ..... | Redstart ... ... | Ruticilla phœnicurus (Linn.) |
| ,, | 27..... | Red-backed Shrike ... | Lanius collurio (Linn). |
| ,, | ,, ..... | Whinchat ... ... | Saxicola rubetra (Linn.) |
| ,, | 28..... | Cuckow ... ... | Cuculus canorus (Linn.) |
| ,, | ,, ..... | Sedge-Warbler ... | Acrocephalus schœnobœnus (Linn.) |
| May | 1..... | Lesser Whitethroat ... | Sylvia curruca (Linn.) |
| ,, | ,,..... | Reed-Warbler ... | Acrocephalus streperus (Vieillot.) |
| ,, | ,,..... | Blackcap ... ... | Sylvia atricapilla (Linn.) |
| ,, | 2..... | Swifts (three) ... | Cypselus apus (Linn.) |
| ,, | ,,..... | Garden-Warbler ... | Sylvia salicaria (Linn.) |
| ,, | 9..... | Martin ... ... ... | Chelidon urbica (Linn.) |
| June | 2..... | Spotted Flycatcher ... | Muscicapa grisola (Linn.) |

### Note of an occurrence of a somewhat uncommon species of the Fringilla Family near Boughton.

| | | | |
|---|---|---|---|
| April | 16..... | Hawfinch ... ... | Coccothraustes vulgaris (Pallas.) |

RICHARD TOMALIN.

# A SYSTEMATIC CLASSIFICATION OF THE LEPIDOPTERA WHICH HAVE OCCURRED IN THE VICINITY OF NORTHAMPTON.[a]

By Wm. Hull and H. F. Tomalin.

The English name is generally that used by Newman, in his *British Butterflies and Moths*; the Scientific synonymes are from various authors, and are subject to a correct spelling where the *Greek* or *Latin* root proves it necessary. [b]

In this classification unimportant varieties and aberrations of species are not included, but the more important ones will be found classed under their respective typical forms.

Sub-Kingdom—Articulata. Class—Insecta.
Order—Lepidoptera.
Section I—Macro-Lepidoptera. A—Group. Rhopalocera.
Family I—Papilionidæ. Genus I.—Papilio (Linn).

*Species* 1...*P. Machaon* (Linn.) ...*Swallow-tail*
Locality.—Kingsthorpe Road. [c]

Family II.—Pieridæ.
Genus I.—Leucophasia (Steph).

,, 1...*L. Sinapis* (Linn.) ...*Wood White*
Locality.—Whittlebury Forest, where it was abundant in 1866. Plane Woods, Preston Deanery, Sywell Wood, Yardley Chase.

Genus II.—Euchloe (Hübn.)

,, 1...*E. Cardamines* (Linn.) ...*Orange tip*

Genus III.—Pieris (Shrank.)

,, 1...*P. Napi* (Linn.) ...*Green-veined white*
,, 2... ,, *Rapæ* ,, ...*Small white*
,, 3... ,, *Brassicæ* ,, ...*Large white*

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a The District which it is proposed to call the "Northampton District" is included in a radius of about fifteen miles, not, however, going beyond the county.

b A Montague Brown's List of British Macro-Lepidoptera and other works.

c These notes are intended to be very brief and are confined to a few species only; there will also be notes on the derivations of the names of several species and genera.

GENUS IV.—APORIA (Hübn.)

*Species* 1...*A.* *Cratægi* (Linn.) ...*Black-veined white*

GENUS V.—COLIAS (Fabr.)

,, 1...*C.* *Edusa* (Fabr.) ...*Clouded yellow*

Locality.—This species occurred in considerable numbers in 1878 at Danes' Camp and elsewhere. The meadows under Collingtree, Biggin, &c., are other localities.

,, 2... ,, *Hyale* (Linn.) ...*Pale clouded yellow*

Locality.—This species has several times occurred in Northamptonshire.

GENUS VI.—GONOPTERYX (Leach.)

,, 1...*G.* *Rhamni* (Linn.) ...*Brimstone*

FAMILY III.—NYMPHALIDÆ.

GENUS I.—VANESSA (Fabr.)

,, 1...*V.* *Atalanta* (Linn.) ...*Red Admiral*

,, 2... ,, *Antiopa* ,, ...*Camberwell Beauty*

Locality.—One specimen of this fine species was taken in the gardens at at the back of the Convent some years ago; a second was taken in the Infirmary gardens eight years ago; a third was taken at Wellingborough, 1872; a fourth was seen and nearly captured at Potterspury, by Mr. G. C. Druce, F.L.S., July, 1875.

,, 3... ,, *Io* (Linn.) ...*Peacock*

,, 4... ,, *Urticæ* ,, ...*Small Tortoise-shell*

,, 5... ,, *Polychloros* ,, ...*Large* ,,

,, 6... ,, *C-Album* ,, ...*Comma*

Locality.—Yardley Chase, Sywell Wood, Lilford, Barnwell Wold, Northampton, etc.

,, 7... ,, *Cardui* (Linn.) ...*Painted Lady*

GENUS II.—MELITÆA (Fabr.)

,, 1...*M.* *Artemis* (Fabr.) ...*Greasy Fritillary*

Locality.—Barnwell Wold, Polebroke, etc.

,, 2... ,, *Cinxia* (Linn.) ...*Glanville*

GENUS III.—ARGYNNIS (Fabr.)

,, 1...*A.* *Selene* (Fabr.) ...*Small Pearl-bordered Fritillary*

,, 2... ,, *Euphrosyne* (Linn.) ...*Pearl-bordered* ,,

,, 3... ,, *Adippe* ,, ...*High Brown* ,,

,, 4... ,, *Aglaia* ,, ...*Dark Green* ,,

,, 5... ,, *Latona* ,, ...*Queen of Spain* ,,

,, 6... ,, *Paphia* ,, ...*Silver-washed* ,,

GENUS IV.—LIMENITIS (Fabr.)

,, 1...*L.* *Sibylla* (Linn.) ...*White Admiral*

Locality.—Sywell Wood, Lilford, etc.

GENUS V.—APATURA (Fabr.)

*Species* 1...*A. Iris* (Linn.) ...*Purple Emperor*

Locality.—Whittlebury Forest, Sywell Wood, Yardley Chase, where several specimens where taken last season; they have also been observed at Salcey Forest, Hardingstone, & other places.

FAMILY IV.—SATYRDIÆ.

GENUS I.—MELANGRIA (Meig.)

,, 1...*M. Galatea* (Linn.) ...*Marbled White*

GENUS II.—SATYRUS (Lah.)

,, 1...*S. Megæra* (Linn.) ...*Gate Keeper*

,, 2... ,, *Egeria* ,, ...*Wood Argus*

GENUS III.—EPINEPHILE (Hübn.)

,, 1...*E. Hyperanthes* (Linn.) ...*Wood Ringlet*

,, 2... ,, *Ianira* ,, ...*Meadow Brown*

3... ,, *Tithonus* ,, ...*Small Meadow Brown*

GENUS IV.—CŒNONYMPHA (Hübn.)

,, 1...*C. Phampilus* (Linn.) ...*Small Heath*

FAMILY V.—ERYCINIDÆ.

GENUS I.—NEMEOBIUS (Steph.)

,, 1...*N. Lucina* (Linn.) ...*Duke of Burgundy Fritillary*

Locality.—Yardley Chase, Sywell Wood, Whittlebury Forest, etc.

FAMILY VI.—LYCÆNIDÆ.

GENUS I.—POLYOMMATUS (Latr.)

,, 1...*P. Arion* (Linn.) ...*Large Blue*

Locality.—Wigsworth, Barnwell Wold.

,, 2... ,, *Acis* (Fabr.) ...*Mazarine Blue*

Locality.—Sywell Wood.

,, 3... ,, *Alexis* (Steph.) ...*Common* ,,

,, 4... ,, *Ægon* (West.) ...*Silver-studded Blue*

Locality.—Sywell Wood.

GENUS II.—LYCÆNA (Fabr.)

,, 1...*L. Phlæas* (Linn.) ...*Small Copper*

GENUS III.—ZEPHYRUS (Dalm.)

,, 1...*Z. Betulæ* (Linn.) ...*Brown Hairstreak*

,, 2... ,, *Quercus* ,, ...*Purple* ,,

### GENUS IV.—THECLA (Fabr.)

*Species* 1...*T. Rubi* (Linn.) ...*Green Hairstreak*
,, 2... ,, *Pruni* ,, ...*Black* ,,
,, 3... ,, *W.-Album* (Knoch.) ...*White-W. Hairstreak*
Locality.—Sywell Wood, Yardley Chase, Salcey Forest.

## FAMILY VII.—HESPERIIDÆ.

### GENUS I.—HESPERIA (Fabr.)

,, 1...*H. Alveolus* (Hübn.) ...*Grizzled Skipper*
Locality.—Yardley Chase, Sywell Wood, etc.

### GENUS II.—NISONIADES (Hübn.)

,, 1...*N. Tages* (Linn.) ...*Dingy Skipper*

### GENUS III.—CYCLOPIDES (Hübn.)

,, 1...*C. Paniscus* (Fabr.) ...*Spotted Skipper*
Locality.—Whittlebury Forest, Yardley Chase, etc.

### GENUS IV.—PAMPHILA (Fabr.)

,, 1...*P. Comma* (Linn.) ...*Silver-spotted Skipper*
Locality.—Barnwell Wold.
,, 2... ,, *Sylvanus* (Esp.) ...*Large* ,,
,, 3... ,, *Linea* (Steph.) ...*Small* ,,

## HETEROCERA. B—GROUP, SPHINGES.

## FAMILY I.—SPHINGIDÆ.

### GENUS I.—ACHERONTIA (Hübn.)

*Species* 1*d*..*A. Atropos* (Linn.) ...*Death's-head Hawk-moth*
Locality.—Infirmary Gardens, Wellingborough, Collingtree, Kingsthorpe, etc.

### GENUS II.—SPHINX (Linn.)

,, 1 ..*S. Convolvuli* (Linn.) ...*Convolvulus Hawk-moth*
Locality.—One taken near All Saints' Church, Wellingborough, 1880; two at Wellingborough, 1881; two at Northampton, 1881; one at Chapel Brampton, 1881.
,, 2*e*.. ,, *Ligustri* (Linn.) ...*Privet Hawk-moth*

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*d* This is the largest *Lepidopterous* insect in Britain, and with one exception in Europe; on the head and thorax is the representation with marvellous fidelity of a pale yellow skull on a black ground; this species has the power of emitting a shrill squeaking sound, which power but few *Lepidopterous* insects possess.

*e* The caterpillar of this moth, from its supposed resemblance (when in an attitude of repose) to the *Egyptian Sphynx*, first gave the name of *Sphinx* to the genus, *Sphingidæ* to the family, and lastly that of *Sphinges* to the whole group.

### GENUS III.—CHŒROCAMPA (Dup.)

*Species* 1*f*..*C. Celerio* (Linn.) ...*Sharp-winged Hawk-moth*

,, 2*g*.. ,, *Elpenor* ,, ...*Elephant Hawk-moth*

Locality.—Milton, Yardley Chase, Houghton Magna, Harlestone, Wellingborough.

,, 3... ,, *Porcellus* (Linn.) ...*Small Elephant Hawk-moth*

Locality.—Yardley Chase.

### GENUS IV.—SMERINTHUS (Latr.)

,, 1...*S. Tiliæ* (Linn.) ...*Lime Hawk-moth*

,, 2... ,, *Populi* ,, ...*Poplar* ,,

,, 3... ,, *Ocellatus* ,, ...*Eyed* ,,

### GENUS V.—MACROGLOSSA (Ochs.)

,, 1...*M. Stellatarum* (Linn.) ...*Humming-Bird Hawk-moth*

### GENUS VI.—HEMARIS (Dalm.)

,, 1...*H. Bombyliformis* (Ochs.)...*Broad-bordered Bee Hawk-moth*

Locality.—Yardley Chase.

,, 2... ,, *Fuciformis* (Linn.) ...*Narrow* ,, ,, ,,

Locality.—Harlestone Heath.

## FAMILY II.—SESIIDÆ [h]

### GENUS I.—TROCHILIUM (Scop.)

,, 1...*T. Apiformis* (Linn.) ...*Hornet Clearwing*

Locality.—Denton, Abington, Grendon, Castle Ashby, Milton, Yardley Hastings, Railway Embankment Blisworth.

### GENUS II.—SESIA (Fabr.)

,, 1...*S. Tipuliformis*(Clerck.) ...*Currant Clearwing*

## FAMILY III.—ZYGÆNIDÆ.

### GENUS I.—INO (Leach.)

,, 1...*I. Statices* (Linn.) ...*Green Forester*

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*f* This single specimen of *Celerio* was not taken in Northamptonshire, but at Stony Stratford, in Buckinghamshire, at the most half-a-mile beyond the County Boundary, resting on a window in the Market Place.

*g* The head and first two segments of this caterpillar narrow suddenly like the head and snout of a hog, hence the generic name *Chœrocampa*, which signifies hog caterpillars.

*h* These moths generally resemble some species of *Hymenoptera* in appearance, and some authors divide the Sphinges into two groups, *Sphinges* and *Lignivoræ* (so named from the habits of the caterpillars)—this last division including all but the first family in our classification.

## GENUS II.—ZYGÆNA (Fabr.)

*Species* 1...*Z. Lonicerœ* (Esp.) ...*Five-spot Burnet*

Locality.—Harlestone Heath, Yardley Chase.

,, 2... ,, *Filipendulæ* (Linn.) ...*Six-spot Burnet*

*(To be continued.)*

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The main groups are frequently termed *Sphingina*, *Bombycina*, *Cuspidatina*, *Noctuina*, *Geometrina*, *Deltoidina*, *Pyralidina*, *Crambidina*, *Tortricina*, *Tineina*, and *Terophorina*.

Of sixty-six British species of Rhopalocera we have recorded in the above list fifty-seven species.

The "Butterflies" are frequently termed *Rhopalocera* from the form of their antennæ, and the "Moths" *Heterocera*; the *Butterflies*, *Hawk-Moths*, and *Moths* were often termed respectively *Diurnal*, *Crepuscular*, and *Nocturnal Lepidoptera*, in allusion to their times of flight, but as a great proportion of the two latter groups fly by day these terms are now but little used.

Of thirty-six British species of Sphingina we have recorded in the above list seventeen species.

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With the concluding portion of this classification will be appended a table of groups and families, also a comparative table, showing the number of species of European, British, and Northamptonshire Lepidoptera.

## METEOROLOGICAL REPORT FOR APRIL, MAY, AND JUNE, 1882.

THE first twelve days of April were cold and bright, with North-Easterly winds and frosty nights, which somewhat checked vegetation. The barometer ranged very high during the first week, but began to fall on the 8th, reaching its lowest point on the 12th, when rain fell heavily, and an unsettled period set in which lasted through the month, with thunder and hailstorms in many places. The heavy gale of the 29th did much damage to the young foliage of the trees, especially at the Southern end of the County. Hawthorn was in bloom on the 25th, and oak trees in leaf as early as the 16th. It should, however, be noticed that a season otherwise early was remarkable for the late arrival of the migratory birds, which failed to put in an appearance at their usual time. The cuckoo was heard at Twywell on the 17th, and at Pitsford on the 20th. The Rainfall for the month was, as will be seen by the table, pretty equally distributed, and very much above the average.

The stormy weather at the end of April culminated in the storms of the 2nd and 3rd of May, the storms on the latter date being very general throughout the County. The Rev. H. Waller reports that in a heavy hail-storm on the 2nd he measured a hailstone 2¼ inches in circumference. The storms of the 3rd seem to have had their centre near Castle Ashby, where the greatest amount of rain fell on that day, and when one storm succeeded another at intervals, the storm of hail and rain in the afternoon being so heavy that the ground was white with hailstones in the course of a few minutes. The weather from the 8th to the 22nd was fine and dry with N.E. winds, but on the 22nd another stormy period set in with thunderstorms at Pitsford, Northampton, Hazelbeach, etc. The last few days were fine and warm.

The first part of the month of June was very disappointing to those who had been hoping for a better season. From the 3rd to the 13th inclusive the weather was cold and changeable, with heavy rains, which averaged for the eleven days ·22 of an inch per day. The Spring corn turned yellow, and the wheat suffered considerably from mildew. The grass crop was, however, a heavy one, and the fine weather which prevailed during the latter part of the month was encouraging to hay-makers, who succeeded in securing the first portion of their crop in good order.

# METEOROLOGICAL OBSERVATIONS, 1882.

## APRIL, 1882.

| STATION. | OBSERVER. | RAINFALL. Total for Month. | Total for Year. | Greatest Fall. In. | Greatest Fall. Date. | Wet Days. | SHADE TEMPERATURE. Maximum. Deg. | Maximum. Date. | Minimum. Deg. | Minimum. Date. |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 3·48 | 7·94 | ·76 | 22 | 17 | 58 | 21 | 32 | 29 |
| " .. | S. Law..... | 3·23 | 7·53 | ·64 | 22 | 17 | 63 | 21 | 26 | 16 |
| Castle Ashby .. | R. G. Scriven..... | 3·54 | 8·10 | ·88 | 22 | 15 | 65 | 21 | 32 | 14 |
| Weedon ..... | R. Capell ..... | 3 60 | 8·82 | ·95 | 29 | 14 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 3·27 | 8·28 | ·80 | 22 | 18 | 67 | 21 | 29 | 16 |
| Rothwell ..... | J. More, M.D..... | 3 04 | 7 36 | ·77 | 22 | 19 | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | 3·11 | 7·39 | ·57 | 22 | 14 | .. | .. | .. | .. |
| Towcester ..... | J. Webb ..... | 4 04 | 8·84 | ·79 | 22 | 17 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 3·36 | 7·70 | ·74 | 22 | 17 | 60 | 17 | 37 | 16 |
| Pawsley ..... | Lady Knightley.... | 3·20 | 7·97 | ·72 | 29 | 17 | 60 | 21 | 31 | 15 |
| Thorpe Man'ville | Seth Barnes ..... | 3·60 | 9·35 | ·93 | 29 | 12 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 2·86 | 6·62 | ·45 | 26 | 19 | .. | .. | .. | .. |
| Haselbeach .... | E. T. Morgan..... | 3·44 | 7·95 | ·88 | 13 | 16 | .. | .. | .. | .. |
| Average 16 years 1866-81 ..... | H. Terry ..... | 1·69 | 7·17 | .. | .. | .. | .. | .. | .. | .. |

## MAY, 1882.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 1·87 | 9·81 | ·39 | 25 | 11 | 65 | 22 | 37 | 16 |
| " .. | S. Law..... | 1·66 | 9·19 | ·33 | 22 | 10 | 70 | 22, 28, 29 | 31 | 17 |
| Castle Ashby .. | R. G. Scriven..... | 2·38 | 10·48 | ·79 | 3 | 12 | 72 | 22 | 35 | 16 |
| Weedon ..... | R. Capell ..... | 1·32 | 10·14 | ·55 | 25 | 10 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 1·84 | 10·12 | ·50 | 4 | 12 | 77 | 22 | 30 | 17 |
| Rothwell ..... | J. More, M.D..... | 1·13 | 8·49 | ·33 | 25 | 13 | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | 1·61 | 9·00 | ·41 | 3 | 10 | .. | .. | .. | .. |
| Towcester .... | J. Webb ..... | 1·62 | 10·46 | ·40 | 25 | 11 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 2·32 | 10·02 | ·70 | 3 | 10 | 58 | 23 | 45 | 16 |
| Pawsley ..... | Lady Knightley .. | 1·41 | 9·38 | ·59 | 25 | 10 | 67 | 22, 23, 28 | 35 | 8 |
| Thorpe Man'ville | Seth Barnes ..... | 1 55 | 10 90 | ·75 | 25 | 9 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 2 08 | 9·26 | ·87 | 2 | 10 | .. | .. | .. | .. |
| Whittlebury.... | W. S. Miller ..... | 1·63 | 11·02 | ·44 | 22 | 13 | 69 | 22 | 22 | 8 |
| Haselbeach .... | E. T. Morgan..... | 1·61 | 9 55 | ·42 | 22 | 13 | .. | .. | .. | .. |
| Average 16 years 1866-81 ..... | H. Terry ..... | 1·70 | 8·91 | .. | .. | .. | .. | .. | .. | .. |

## JUNE, 1882.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 2·72 | 12·53 | ·50 | 3 | 18 | 66 | 29 | 42 | 2 |
| " .. | S. Law ..... | 2·52 | 11·71 | ·41 | 3 | 18 | 73 | 27 | 36 | 17 |
| Castle Ashby .. | R. G. Scriven ..... | 3·15 | 13·65 | ·65 | 3 | 19 | 75 | 29 | 41 | 16 |
| Weedon ..... | R. Capell. ..... | 2·82 | 12·96 | ·45 | 22 | 15 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 3 64 | 13 76 | ·78 | 9 | 19 | 79 | 25 | 36 | 17 |
| Rothwell ..... | J. More, M.D ..... | 2·50 | 10 54 | ·40 | 3 | 18 | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Towcester ..... | J. Webb ..... | 3·22 | 13·48 | ·37 | 3 | 20 | .. | .. | .. | .. |
| Little Houghton | J. Brawn.... ..... | 2·83 | 12 85 | ·70 | 3 | 17 | 60 | 3 | 40 | 12 |
| Pawsley ..... | Lady Knightley .. | 2·73 | 12·11 | 1·05 | 22 | 17 | .. | .. | .. | .. |
| Thorpe Man'ville | Seth Barnes ..... | 4·22 | 15·12 | ·78 | 22 | 18 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 2·46 | 11·72 | ·80 | 4 | 17 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller ..... | 3·68 | 14·70 | ·35 | 3 | 21 | 71 | 29 | 32 | 15 |
| Haselbeach .... | E. T. Morgan..... | 3·74 | 13·29 | ·87 | 9 | 20 | .. | .. | .. | .. |
| Average 16 years 1866-81 ..... | H. Terry ..... | 2·25 | 11·10 | .. | .. | .. | .. | .. | .. | .. |

HENRY TERRY, SURGEON.

## MEETINGS.—APRIL.

A MEETING of the Society was held on April 25th, in the Museum Committee Room, Town Hall, under the presidency of Mr. J. Eunson. There was a large attendance. Seven new members were elected, as follows:—Miss M. Bostock, Rev. A. E. Holthouse, Messrs. Jas. Barry, T. G. Fraser, Chr. Markham, H. F. Tomalin, and — Wakeman.

The Rev. S. J. W. Sanders brought forward the subject of the death of Mr. Charles Darwin; he said the deceased gentleman did their Society a great honour by joining it as an honorary member, and giving the members the benefit of his patronage and of his name, and good example. He did not think the French people were too extravagant when they said the other day that Professor Darwin would take rank in the history of the world with Homer and Virgil, and he quoted with approval the words of the "Spectator," that the most eminent scientific naturalist and thinker of this planet had just died. As a Society, they ought not to let the occasion pass without entering upon their minutes the record of their humble appreciation of the services Mr. Darwin rendered to science, and their regret at his decease, and he moved a resolution to that effect. Personally he (Mr. Sanders) felt more than pleased, he felt elated, that Mr. Darwin was to be buried in Westminster Abbey. He thought it was one of the grandest things, not for science only, but for religion, that he should find a place there. It showed that the religious thought of the present day had departed from those uncharitable lines which, thirty years ago, it trod upon. It showed that people were coming to see that if Mr. Darwin's theories were true—and that had not yet been proved, though he supposed all present believed in them to some degree, and science was ever progressing—there was nothing to be feared for religion in them, but rather something which would bring out the salient points of religion as distinguished from dogma more and more. (Applause.) Mr. W. D. Crick, in seconding the motion, referred to the courteous treatment he had received from Professor Darwin, when he communicated with him on a scientific matter. He (Mr. Crick) was afraid that the fact he had to state was almost too insignificant, but Mr. Darwin did not seem to think so. The resolution was unanimously adopted. The Rev. S. J. W. Sanders then gave an interesting "talk" on "Glaciers." This "talk" was one of a series which had been proposed of a popular kind, so as to interest in scientific matters members of the Society whose reading had not advanced far enough to make them versed in technicalities. Mr. Sanders brought his address to a close with an account of a glacier near the Hardanger Fjord, Norway, which he had visited.

## MAY.

We have this summer succeeded in getting good sectional meetings fairly started, and numerous specimens have been exhibited at them by various members. Three sections are taken at each meeting. The Photographical Section, as hitherto, have separate meetings (occasionally out-door) for work.

On May 9th a meeting of the Botanical, Microscopical and Ornithological Sections was held, Mr. J. Eunson in the chair, Eighteen new members were elected, viz. :—Messrs. H. Chandler, T. P. Dorman, F. Durham, M.A., J. J. Faulkner, LL.D., T. Garratt, T. E. Gray, J. Haviland, M.A., B. Heselden, W. T. Morris, A. F. Mulliner, B. B. Muscott, G. H. Percival, M.B., G. W. Rands, G. Turner, T. H. Vialls, T. H. Woolston, Rev. F. H. Wood, M.A., and Miss Webb. Professor Etheridge, President G.S., was elected an honorary member. Mr. A. Kempson having taken the chair, Mr. C. E. Crick gave a short description of the Ranunculaceœ, an order represented in Britain by about 14 genera, its distinctive characters being: free calyx and corolla and hypogynous stamens. Taking the common buttercup, the use was explained of each of the four whorls of leaves in the flower—the calyx to protect the more delicate parts, the corolla by its bright colour to attract insects—often such important agents in the work of reproduction. The peculiarity was noted of the water-buttercup having two kinds of leaves, those submerged being in the form of very fine segments and the floating ones reniform and lobed. The modifications were also traced of the characters of Ranunculi as shown in the Columbine, Larkspur, Monkshood, etc.

In the Microscopical Section Mr. Kempson showed the pollen grains of the leopard's bane (*Doronicum Pardaliauches*); and a slide which attracted considerable attention was a very fine section of a child's scalp, showing in a capital manner the parts of the hair glands. Mr. W. D. Crick exhibited a specimen of batrachospermum, a fresh water algae.

On the 23rd, a meeting of the sections Geology, Entomology and Meteorology was held, Mr. W. Hull presiding. Mr. W. D. Crick gave an account of the tunnel boring at Wymington, describing a drift clay, probably analogous to the Oxford clay, containing septarian nodules, a specimen of which he exhibited; also *Ammonites excavata* and *A. Lamberti*. Mr. Herbert F. Tomalin then read before the Entomological Section a most interesting paper, which is reproduced in this number, upon the imperfectly known family of the *Sesiidæ*, a tribe of the hawk moths, and gave, as the result of his own observation, a short life-history of the most prominent representative of the family—*Trochilium Apiformis*—the

A meeting of the three sections, Botany, Microscopy and Ornithology, was held on Tuesday, the 4th, Mr. Beeby Thompson in the chair. Four new members were elected : the Revds. L. H. Loyd, M.A., & G. B. Hooper, M.A., Messrs. Neville Bostock and C. T. Merrick. Mr. H. F. Tomalin read a paper upon the Saxicola—more particularly describing the Winchat and its haunts, also exhibiting specimens of the birds. Lord Lilford's present, Dresser's "Birds of Europe" having being returned from the binder, was laid upon the table for inspection. Mr. S. J. Newman read a few notes upon Bacillus Subtilis and Bacillus Anthrax, describing their transmutations.

On Tuesday, the 18th, there was a meeting of the Geological, Entomological and Meterological Sections, the Rev. S. J. W. Sanders in the chair. The following new members were elected :—Mrs. F. B. Newman, Burton Latimer; and Messrs. H. Stafford O'Brien, Blatherwycke Park; C. H. Keenan, and — Elkington. Mr. B. Thompson gave an interesting account of the different ammonite zones in the middle and upper part of the Lower Lias, recounting the difference in the zones as given by Mr. Etheridge, F.R.S., late president of the Geological Society, and other geologists. This account was illustrated by the exhibition of fossils from various places in the county, amongst those being the Braunston Section, Kilsby Tunnel, Banbury, &c. The fossils included ammonites of many species, *e.g.*, Ibex, Henleyi, Beckii, Valdani, Pauli, Capricornus defossus also Inoceramus ventricosus, Tornitella capricorni, Actœnina Illminsteriensis, Limea acuticosta, Modiola scalprum, modiola mimismalis, Nucula inflexa or Leda Galathœa, Protocardium truncatum, Cardita multicostata, macrodon liasinus, &c. In the Entomological Section Mr. Elkington exhibited some specimens of the caterpillars of the Emperor moth, Saturnia pavonia minor, reared by him. Mr. H. Tomalin said that this moth had been captured at Harlestone and Salcey Forest, and also that Sphinx convolvuli (convolvulus Hawk Moth) had been captured at Chapel Brampton. Mr. Boddington exhibited a case of over 40 species of butterflies and moths, all caught this year, mostly in Yardley Chase. Mr. Rogers also showed a collection of land and fresh water shells, amongst which were Helix Aspera, H, nemorosa H, arbustorum, H. rotundata, Sphœrium, Paludina viviparum, Limnea stagnalis, &c.

## MOLLUSCA.

Mr. W. D. Crick is at present occupied in compiling a list of the Mollusca of the county. He will be glad to hear of any species which have been observed by any member, or notes of any collection which may have been made. Letters may be forwarded to the Science School, Northampton.

TWO CHESNUT TREES AT MILTON PARK.

*Printed by the Woodbury Permanent Printing Company from a Negative by Mrs. R. G. Sexton.*

# TREES OF NORTHAMPTONSHIRE. XI.

## Two Chestnut Trees at Milton Park.

The trees which are the subject of our illustration stand close to the border of a piece of ornamental water, in the grounds attached to the Mansion at Milton Park, and only a short distance from the South front of the house. They are of considerable size, measuring respectively 15 feet 8 inches and 14 feet 6 inches in circumference at 5 feet from the ground, and the heads growing into one another form in the Winter, or in the early Spring, at which time the photograph was taken, an intricate maze of interlacing branches, and in the Summer a dense mass of foliage. The most remarkable feature of these trees is, however, the extent of ground they cover. Growing as they do in an enclosed area they have been protected from damage by cattle, by which our noblest trees are often disfigured, and the branches sweep along the ground in all their native luxuriance. These branches, in some cases, have become partly imbedded in the soil, and, favoured perhaps by the moistness of the situation, have actually taken root, and are now forming what will some day be separate trees, though they are still connected with the parent stem.

It is very remarkable to notice some of these branches which, in descending to the earth, were only a few inches in circumference. These, though still attached to the tree, from which they continue to derive some nutriment, suddenly swell out to the thickness of a man's thigh, and present an interesting contrast in their new vigour of growth to the small branches which produced them. In one case the original branch is partly decayed, and the connection with the tree will probably soon be entirely severed, while the remainder looks healthy and flourishing, and quite ready to begin an independent existence.

The greatest diameter now covered by the two trees and their offspring is about 126 feet, but some of the younger branches which were broken off by a large limb which fell from the tree in October, 1881, must formerly have reached 4 or 5 feet further.

This photograph was taken in March, 1882.

# NOTES ON THE BIRDS OF NORTHAMPTONSHIRE.

By Lord Lilford, F.L.S.

76. Tree-Sparrow. *Passer montanus.*

This species is tolerably common, and breeds in many parts of North Northamptonshire. In the winter months the Tree-Sparrow may be found in considerable numbers about our hedgerows and stackyards in company with House-Sparrows and the various species of Finch which resort thither at that season; but in the spring these birds separate from their cogeners, and are to be found nesting generally in small colonies of three or four pairs in old hollow trees, especially (in our neighbourhood) detached ash, willows, and walnuts. The nest is generally built in a hole at a considerable height from the ground, and is composed of dry grass with a lining of feathers. The average complement of eggs is about six; they very much resemble those of the House-Sparrow in colour and markings, though, as a rule, the ground-colour is lighter than in those of that species, and the eggs considerably smaller. The Tree-Sparrow is a lively, active bird, with a good deal of the habits and manners of his more common relation, but without the familiarity and impudence of that bird; in fact we are inclined to consider the present rather a shy species; and although there are certain localities in the vicinity of Lilford in which we can always be pretty certain of finding the bird, the obtaining of specimens when required is by no means equally certain. The ordinary notes of the Tree-Sparrow are sharper and more shrill than those of the House-Sparrow, to which, however, they have a great resemblance; at the pairing-season we have occasionally heard a sort of prolonged chatter from the male bird, which we presume to be the "proper song" mentioned in the fourth edition of Yarrell's 'British Birds;' far be it from us to pronounce it *improper*, but we question its title to be considered a song. The chief peculiarity of the Tree-Sparrow is the close resemblance of the sexes, which are indeed hardly to be distinguished in plumage from each other. We have met with this species in various parts of the continent of Europe, but nowhere in great abundance; in England it is certainly more common in the eastern than the western counties, though not rare in certain portions of Lancashire and Cheshire. The food of this bird consists of seeds of many kinds, varied in summer by insect diet, as is the case with all the species of this family. In captivity the Tree-Sparrow thrives well upon canary and millet-seed, and becomes very tame.

77. HOUSE-SPARROW. *Passer domesticus.*

This bird is so thoroughly well known by every one in town and country that we feel that any details as to its habits would be quite superfluous. We do not consider that Northamptonshire, or at all events that portion of it with which we are most intimately acquainted, is by any means remarkable for an abundance of Sparrows, though they are quite sufficiently common. I find that the Sparrows which manage to get through the meshes of the wire netting of a portion of the aviaries at Lilford soon become so fat that they are unable to get out again, though this is not the case with Chaffinches, Green Linnets, and various other birds which also intrude there. Though the damage done by these birds to the farmer at certain seasons is very considerable, and I personally owe them a grudge, on account of the quantity of grain and seeds intended for other birds which they devour, I am decidedly of opinion that they more than compensate us for such petty larceny by the enormous amount of destructive caterpillars and grubs which they destroy in the summer. The present species is more or less common in most parts of Europe which we have visited, with the exception of certain parts of Italy, Sardinia, and Malta, and the Islands of Sicily, in which localities its place is occupied by two very closely allied species—the Cisalpine and so-called *Spanish* Sparrows, *Passer italiæ*, and *P. saliceti*. In the neighbourhood of Algiers we met with the three species; but our present bird is there in a small minority, whilst throughout Spain it is the prevalent representative of the Sparrow family in the towns and villages, the Spanish Sparrow being generally found in the less frequented parts of the country, nesting in large colonies in woods and thickets, evincing a remarkable partiality for the neighbourhood of nests of certain birds of prey, *e.g.* the Common and Black Kites; we have, in fact, often found nests of this last-named Sparrow actually built in the substructure of those of the two species just mentioned, and can only presume that the Sparrows court such vicinity as a protection from the smaller Falconidæ, their deadly enemies. The House-Sparrow, although perhaps the most familiar and impudent of birds, is extremely wide awake and cautious about traps and snares, and, his suspicions of danger once aroused, is very difficult to catch. This of course applies to the old birds only; the young are easily taken during the first summer of their existence, but soon learn to make themselves scarce on the appearance of a gun, and to appreciate the difference between that weapon and a walking-stick. We have met with and heard of many white, cream-coloured, and pied varieties of this species in various parts of our county.

78. HAWFINCH. *Coccothraustes vulgaris.*

Till the spring of the year 1870 we only knew the Hawfinch in the neighbourhood of Lilford as an occasional and by no means a common winter

visitor. On April 4th of the year just named I observed some half dozen or more of these birds haunting the old thorn-bushes on our lawn; they remained about for some days, but, in spite of minute and protracted search in the most likely localities, we could not discover that they attempted to nest with us, and they had all disappeared before the middle of April. A pair or more, however, undoubtedly did breed not far off, for in July and August I constantly observed some of the species about our kitchen-garden. In the very severe weather of December 1870 and January 1871 we were visited by very large flocks of Hawfinches; and since the date last named some of these birds have nested regularly about our pleasure grounds, and have become only too well known to our gardeners and cottagers from their constant and serious depredations amongst the green peas and other vegetables. Several young Hawfinches taken from the nest have been brought to me during the last few years; and at this time of writing (November 28, 1880), I have a pair alive taken from a nest not far from the house at Lilford; this nest was built in a young oak tree close to a footpath in a large wood, and within ten days after the taking of the young Hawfinches was occupied by a Wood-Pigeon, who added a few twigs to the nest, and thereupon hatched and reared her two young birds. I have been informed of the nesting of Hawfinches at Deene, Weldon, Bulwick, and near Northampton, so that we may now reckon this species as a regular resident in our county. The Hawfinch is a very shy and wary bird, by no means easy to approach, but in captivity becomes very familiar, and, though its vocal capabilities are not remarkable, is amusing from its grotesque manners and attitudes. In the winter months the food of this species consists of beech-mast, the seeds of the hornbeam, and the kernels of haws and other berries. I have often noticed that the Hawfinch rejects the flesh or pulp of fruit, and appears to care only for the seed or kernels, for obtaining which objects its powerful beak is most admirably adapted. When not engaged in seeking for food these birds generally select the highest branches of some tall tree, whence their peculiar sharp call-note may often be heard, and whence, on the slightest alarm, they dart off with a very swift undulating flight to some other safe look-out station. The nests of this bird which have come under my observation have all been placed at some height, fifteen to thirty feet, from the ground, for the most part in hawthorns or oaks; but evergreens of various kinds and apple trees are often selected for this purpose. The nest is large and loosely built of pliable twigs and tree-lichens, with a lining of fine roots, hair, and sometimes a little grass. The eggs are of a pale greenish blue, spotted and streaked with dark brown; the usual complement is five, though we have now and then met with six. It appears from Yarrell and other ornithological works that the Hawfinch has been and is extending its breeding-range in this country generally, but that it is most abundant in what are known

as the home-counties, Middlesex, Surrey, Kent, Essex, &c., in most of which it has long been known to nest regularly, whilst in certain parts of England it is still considered a rare bird at all times. Morton makes no mention of the Hawfinch in his Natural History of our county; and it seems improbable that such a peculiar and, to a certain extent, conspicuous bird should have escaped his notice unless very uncommon. In my Harrow schooldays we several times met with nests of the Hawfinch in that neighbourhood; and a few of these birds were generally to be found in the gardens and pleasure-grounds of Holland House, Kensington, though I do not recollect to have heard of their breeding there. I have never noticed that the Hawfinch associates with other species; and in the gardens around Lausanne, where this bird and the common Crossbill, *Loxia curvirostra*, were both exceedingly common in the winter of 1850-51, the two species always kept apart, probably on account of the pugnacious character of the Hawfinch, as the Crossbill is remarkably sociable and apparently fond of the company of other birds. My two caged Hawfinches above mentioned readily devour meal-worms and house-flies; but I imagine that this is an unnatural and acquired taste. We have met with this species in various parts of Europe; it is locally very abundant in Southern Spain, where it is commonly known as "Cascanueces," *i. e.* Nutcracker. In the neighbourhood of Algiers we found it in small numbers throughout our stay in the country, which extended from the end of October 1877 till May 1878. It is perhaps hardly necessary to mention that this bird is often known in this country as the Grosbeak.

79. GREENFINCH. *Coccothraustes chloris.*

This is one of our most abundant resident species, and too well known to require much detail at my hands. It is not a bird of any particular merit, except as a destroyer of caterpillars, and it therefore is worthy of protection in spite of the accusations brought against it by many gardeners, with a certain amount of reason, of destroying the buds of various fruits, and a particular fancy, to which we can testify, for young lettuces and other plants of that order. The Greenfinch seems to especially affect evergreen shrubs, both as nesting and winter roosting-resorts, and in our youthful nocturnal bird-catching excursions was the species which suffered most frequently amongst the laurels, box, laurustinus, &c., of our Northamptonshire gardens and shrubberies. This species appears to pair early. We have often found nests containing eggs in the first week of April, and three, if not four, broods are often reared. The male bird has a habit of floating in the air, singing his best during the pairing season; but his best is, to our ears, a poor performance, and his ordinary ditty tedious and monotonous to a degree. I think that five is about the average complement of eggs, but have several

times met with six. In the winter months the Greenfinch resorts to the hedges and stubbles in company with other allied species, and may often be found about the stackyards, but generally returns to the favourite evergreens at nightfall. This bird is common in most parts of Southern Europe and in Algeria, in which last country a very brilliantly coloured race or variety, which has been raised to the rank of a distinct species by some ornithologists under the name of *Fringilla aurantiiventris*, is equally abundant. This bird presents no difference in notes, habits, or structure from the ordinary European type, and is only distinguishable by the vivid intensity of its plumage.

80. GOLDFINCH. *Carduelis elegans.*

This beautiful little bird, though decidedly less common with us than it was before the practice of careful field-weeding became general, is, I am glad to say, still well known, and by no means rare in most parts of our county as a resident species, whose numbers are increased in most winters by flocks of strangers,—I mean birds not bred in our district. The Goldfinch is so justly a favourite, from its cheerful song and beauty, that it is perhaps the bird which suffers more than any other from the cunning of the bird-catcher; and we have of late years been grieved to find several of these artists plying their trade with limed twigs and call-birds about our high roads and lanes; but it is in the neighbourhood of our large towns and on our southern coasts that the principal havoc has been wrought amongst these delightful little birds. In the fourth edition of Yarrell's 'British Birds,' vol. ii. p. 118, will be found a quotation from the 'Zoologist,' in which the writer estimates "the average annual captures of this species near Worthing at about 1154 dozens, nearly all being cock birds." This statement was published in 1860. The editor of the edition of Yarrell's 'British British' goes on *loc. suprâ cit.*, to quote Mr. Swaysland, a well-known bird-preserver at Brighton, who, in his evidence before the Select Committee on Wild Birds Protection, printed July 23, 1873, states that formerly a boy could catch forty dozen of Goldfinches in a morning within ten miles of Brighton, whereas they are now comparatively scarce, and not a hundred may be seen even at the most favourable time of year. In April our flocks of Goldfinches break up, and leaving their favourite autumn and winter resorts in the rough pastures and the roadside fences, distribute themselves in pairs about our shrubberies and gardens. We have usually at least two nests in the flower-garden at Lilford quite close to the house, besides several more at a short distance. The exquisitely neat little nest is by no means always easy to discover, being often placed at the end of a leafy bough of oak, horse-chestnut, plane, or other large-leaved tree, not

unfrequently amongst the topmost twigs of a fruit-tree, and now and then near the top of a tapering cypress or Irish yew. The eggs are generally five, and are probably too well known to my readers to require description. The partiality of the Goldfinch for the seeds of the thistle and other of our common weeds is well-known; and a prettier sight to the eye of a lover of birds than a flock of these little living gems busily engaged in examining a tall patch of flowering thistles is hardly to be met with in this country. In captivity the Goldfinch will readily mate with the Canary, Greenfinch, Common Linnet, and other species, and is remarkable for its docility in learning various tricks; but, as the editor of the fourth edition of Yarrell's 'British Birds' most truly remarks, all this is "violating the laws of nature," and, in our opinion, very much to be deprecated. The Goldfinch is found in all parts of Europe which we have visited, from Corunna to Cyprus, and is very abundant in Algeria.

81. SISKIN. *Carduelis spinus.*

Although this bird cannot be called abundant in our neighbourhood, I have never failed to meet with it in small flocks whenever I have been at Lilford in the months of January and February. A few appear on the banks of the river during severe weather in January, and generally remain with us for several weeks, some occasionally prolonging their stay till April; but, as a rule, we seldom see them later than the beginning of March. Whilst with us the favourite haunts of the Siskin are the groups of alders near the water, the small flocks, in which the females always greatly outnumber the males, keep together, constantly uttering a musical call-note, and cluster in all sorts of positions upon the sprays which hang over the river. The Siskin is one of the most naturally tame and familiar birds with which I am acquainted, and becomes immediately reconciled to a cage. I well remember an instance in which a male bird of this species, which had not been caught more than a few days, escaped from his cage, but returned to it in the course of an hour or two, and this without the attraction of a companion in captivity, and in spite of an abundance of favourite food in the shrubbery into which he had made his way. The Siskin breeds in considerable numbers in the Highlands and occasionally in other parts of Scotland; and many instances of its doing so in England are on record, and it will nest freely, in favourable circumstances, even in confinement. From its extreme tameness, pleasant notes, and beauty, it is a most attractive cage-bird, and thrives well in confinement. As we never have had the good fortune to meet with a nest of this species, we must refer our readers to Yarrell's 'British Birds' for a full account of its breeding habits, eggs, &c.,

and will only here add that it is known as a winter visitor to most parts of central and southern Europe, in which it occasionally and irregularly remains to nest. The Siskin is also recorded to appear in Algeria and Morocco; but we did not meet with it during our seven months' stay in the former of those countries.

82. MEALY REDPOLL. *Linota canescens.*

The only record of the occurrence of this bird in our county with which I am acquainted is to be found in the fourth edition of Yarrell's 'British Birds,' vol. ii. p. 136, where mention is made of "one shot at Oundle by the late Mr. Pelerin sufficient advanced in its plumage to have acquired a considerable portion of red colour on the breast." This is a species with which we have no personal acquaintance, except as a cage-bird. Its habits appear to resemble very closely those of the Lesser or Common Redpoll, and it seems that a considerable amount of confusion has arisen amongst ornithological writers in the discrimination of the two species. The present is a truly northern species, which occurs irregularly and in varying numbers, chiefly in our north-eastern and eastern counties, during the winter months. I can meet with no authentic record of its having been known to breed in our county.

83. LESSER REDPOLL. *Linota rufescens.*

As far as my own observation goes, this little Finch is not by any means abundant at any time of year in our immediate neighbourhood, and with one exception I have only met with it therein during the winter months. The exception occurred in September of this year (1880), when shooting near Titchmarsh we fell in with about a dozen of this species haunting some willows along a brook-side, with every appearance of belonging to and having established themselves in the locality. Mr. A. G. Elliott, of Stamford, informs me that the Redpoll breeds not uncommonly in the vicinity of that town, and it is by no means improbable that it may do so with us; but, as I have before stated, I am hardly ever at home in the nesting season, and it would be a difficult and thankless task to teach our bird-nesting youth to discriminate between this and other allied species. About Lilford these birds appear occasionally in flocks of from twenty to fifty or sixty, almost always in very severe weather, and then haunt the alders by the river-side, their habits and manner of feeding at that season much resembling those of the Siskin as above described. They are exceedingly tame and may be very closely watched as they cluster like bees on some hanging sprays, searching for buds, and keeping up an incessant

twittering music, pleasant enough, but not by any means so melodious as that of the Siskin. It appears that the Lesser Redpoll breeds in many parts of England, occasionally in great abundance, but it is more abundant at the nesting-period in the northern and eastern counties than in the south. As I have never myself met with a nest containing eggs which I could positively identify as belonging to this species, I must refer my readers to the very full and interesting details given in the fourth edition of Yarrell's 'British Birds.' This bird is such a common and deservedly favourite cage-bird that any description of its song and habits in captivity appears to me unnecessary.

Since writing the above I have been obligingly informed by Mr. W. L. Chapman, of Northampton, that he has twice met with nests of the present species in this county. In a letter dated January 29, 1881, he states that "the first instance was about twenty years ago, in a gooseberry-bush near the General Asylum, Northampton. The other was four years ago in a hedge that surrounds Brampton Bushes, about three miles from Northampton. There were five eggs in the nest, as high in the hedge as a man could reach. When the hen was put off she flew round cal ing, and was soon joined by the cock bird; they continued flying round together till she went on to the nest."

84. LINNET. *Linota cannabina.*

This bird, which is known as Brown, Grey, and Red Linnet, though well known and not uncommon in our district, is by no means one of our most abundant representatives of its family, being a species which particularly affects open commons and furze brakes, in which sort of localities our part of the county is somewhat deficient; wherever furze is found, however, there we may be pretty certain to find the Linnet in the Spring, and there is the spot in which the nest is generally to be found. In the winter months these birds resort to our stubbles and may be seen flitting in small flocks in search of seeds from place to place, seldom, as far as my own observation goes, joining company with other birds, and, curiously enough, almost always roosting on the ground. The song of the Linnet at its best is exceedingly sweet and pleasant, but varies greatly in individual birds, as does the summer dress of the males, some of which assume a brilliant rosy red upon the head and breast, whilst in others the new colour is a dull red-brown; and in a foot-note in the fourth edition of Yarrell's 'British Birds' will be found mention of a variety in which the breast is of a fine lemon-yellow colour. The most brilliantly coloured Linnets with which I have met

were in the north of Spain in the early summer of 1867 and 1876, and we also procured a very brightly coloured male in the little-known island of Scarpanto in 1875. This species is abundant in all parts of Europe with which I am acquainted, as also in Algeria and Tunis. In captivity the Linnet thrives and sings admirably. I am acquainted at this moment with one of these birds which has been caged for nearly nine years, and appears to be in good health; and many cases of a much longer imprisonment, with apparently perfect health and vigour, are on record.

*(To be continued.)*

## MANX SHEARWATER *(Puffinus Anglorum)* IN NORTHAMPTONSHIRE.

A SPECIMEN of this species was picked up in a field of mangold wurzel on the morning of August 24th, near Cranford, Kettering, and sent alive to me by Stephen Soames, Esq., of Cranford Hall, but in spite of all our efforts died yesterday morning. The strong westerly gales which we experienced on 23rd and 24th of this month may account for the presence of this oceanic species so far inland.

LILFORD.

Lilford Hall, Oundle,
August 30, 1882.

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## BREEDING OF THE HOBBY *(Falco Subbuteo)* IN NORTHAMPTONSHIRE.

IN the interests of a somewhat scarce species, I do not give the exact locality of the occurrence above mentioned, but my ornithological fellow county-men may be interested to hear that three eggs of the Hobby were found in an old nest of the Carrion Crow, situated in an oak sapling at about thirty feet from the ground, in a large wood in this county, about the third week of June, 1882; one egg was taken from this nest by a friend on 20th June and is now in my possession, the other two eggs were hatched, and the young birds, taken some five or six weeks ago, are alive, in good health, and great beauty, here at this moment. Another egg of Hobby was found in another wood at no great distance from that above mentioned (I have no particulars as to position of their nest) but only one egg was laid by the Hobby therein, hatched, and the young bird is now here in the same condition as those from the first nest. In both the above instances I am glad to hear that the parent birds escaped destruction, and for all I know to the contrary are still alive and free.

LILFORD.

Lilford Hall, Oundle,
August 30, 1882.

# THE FLORA OF NORTHAMPTONSHIRE.

*(Continued.)*

By G. C. Druce, F.L.S.

Araliaceæ.

614. Hedera Helix, Linn. The Common Ivy. Native. Generally distributed through all the districts.

Cornaceæ.

616. Cornus sanguinea, L. Dogwood. Native.

A common ingredient in hedgerows, as at Kingsthorpe, Upton, etc., Nene a; Abington, etc., Nene b; King's Cliffe (Berkeley), Wittering, etc., Nene c; Grafton, etc., Ouse; Stamford, etc., Welland; Evenley, Cherwell.

Loranthaceæ.

617. Viscum Album, L. The Miseltoe.

Kirby Hall, Welland.

Top. Bot. 32 North'ton (Berkeley.)

Caprifoliacaæ.

618. Adoxa Moschatellina, L. Moschatel. Native, Local.

Behind Grimsbury Mill (French), Cherwell; Boro' Hill, Staverton Glen (Notcutt), Avon; Hartwell, Potterspury, Ouse; Sibbertoft (Berkeley), Welland; Blisworth, Farthingstone (Morton Hist.), Preston Capes (Baker), Ashton, Roade, Nene a; Overstone (Mrs. Birch), Rushton Spinney (Lewin), Nene b.

This pretty little plant of early spring time is rather rare with us, but many of the large hedgerows about Roade still shelter it; doubtless in previous ages it had a wide range in the large woods that existed in that portion of the county.

619. Sambucus nigra, L. The Elder. Native and generally distributed.

Byfield, etc., Cherwell; Winwick, Avon; Boughton Green, Danes' Camp, etc., Nene a; Weston Favell, etc., Nene b; Polebroke, etc., Nene c; Burghley, etc., Welland.

The Elder has been cultivated for its berries from remote time, and a wine prepared from them is still popular in the rural part of the county. A water distilled from the flowers is contained in the present Pharmacopeia; its principle use is for a cosmetic and cooling lotion; the active principle being a peculiar solid essential oil which exists in a very small percentage in the flowers.

620. Sambucus Ebulus, L. Danewort. Native. Local and rare.

Kingsthorpe, Boughton (Morton Hist.), Duston, Harleston, Brockhall, Whilton, Farthingstone, Castle Dykes, Norton, Welton, are localities given in Baker's History, but many since destroyed, Nene a; Castle Ashby (Miss Brent), Nene b; Brigstock (Lewin), Barnwell, Cotterstock (Berkeley), near Peterboro' Bridge (Paley), Nene c; not uncommon about Potterspury and Yardley Gobion, Ouse; Byfield, Cherwell.

This plant is rather poisonous, having cathartic and emetic properties.

621. Viburnum Opulus, L. Guelder Rose. Native. In woods, spinneys, etc. Not common.

Banbury (French), Cherwell; Staverton (Notcutt), Avon; Whittlebury Forest, Stoke Bridge, etc., Ouse; Berry Wood, Weedon, Gayton, etc., Nene a; Delapre, etc., Nene b; Thrapston, Nene b; Southorpe, etc., Nene c.

In Whittlebury Forest, apparently wild, occurs a double flowered form of the above.

622. Viburnum Lantana. Wayfaring tree. Native. Hedgerows and borders of woods. Generally distributed throughout the county.

King's Sutton, Cherwell; Yelvertoft, etc., Avon; Harleston, Harpole, etc., Nene a; Grendon, etc., Nene b; Wittering, Nene c; Barnack, Welland.

624. Lonicera Periclymenum, L. Honeysuckle. Native. Not very common near Northampton.

Harleston, Holdenby, Teeton, Harpole, Gayton, Canal side near Hunsbury Hill, etc., Nene a; Ecton, Castle Ashby, etc., Nene b; Brigstock, etc., Nene c; Rockingham, etc., Welland; Whittlebury Forest, rather rare in Ouse district; King's Sutton, Cherwell; Winwick, Avon.

*623. Lonicera Caprifolium, L. Alien.

Thenford copse (French), Cherwell; Peterboro' (Paley), Nene c.

*625. Lonicera Xylosteum, L. Fly Honeysuckle. Alien.

Planted near Castle Ashby (Rogers), Nene b; in shrubberies and coppices between Brigstock and Farming Woods, nene c.

Rubiaceæ.

629. Galium Cruciatum, L. Cross Wort. Native. Locally common.

Banbury (French), Cherwell; Winwick, abundant, Avon; Brampton Ash, Welland; Althorp, Boughton, Spratton, Harleston, Nobottle, Dodford, Nene a; Hardwick, Broughton, etc., Nene b; Bedford Purlieus, etc., Nene c.

I have no record for Ouse district.

630. Galium verum, L. Native. Dry, sandy or calcareous soil.

Harleston, Boughton, Moulton Park, Danes' Camp, Duston, etc., Nene a; Weldon, Raunds, etc., Nene b; Southorpe, etc., Nene c; Grafton, Cosgrove quarries, Ouse; Ufford quarries, Welland; Evenley, Broughton, Cherwell; Barby (Scott), Avon.

Formerly used to curdle milk, and Cheshire cheese was, according to Gerarde, made with this plant, the colouring matter probably being extracted at the same time.

631. Galium erectum, Huds.

Northampton Castle, Watson's New Botanist's Guide, recorded by Mr. Anderson.

Badby Woods (Baker), a doubtful record, Nene a; borders of Whittlebury Forest, near Potterspury, since destroyed, Ouse.

632. Galium Mollugo, L. Native. Hedgerows and waste places. Generally distributed.

Harleston, Blisworth, Badby, etc., Nene a; Brigstock, Barnwell, etc., Nene c; Furtho, etc., Ouse; Barnack, Welland; Croughton, Cherwell.

633. Galium Saxatile, L. Heath Bedstraw. Sandy heaths. Local.

Brampton (Baker), Kingsthorpe Bushes, Harleston Firs, Badby Woods (Baker), Nene a; Overstone (Mrs. Birch), Nene b; Peterboro' (Paley), Nene c; Barnack, Welland; Croughton Spinney, Cherwell.

Probably absent from Ouse District.

635. Galium palustre, L. Native. Marshes and wet places. Rather common and generally distributed.

Nene banks, Daventry reservoir (Notcutt), etc., Nene a; Delapre meadows, etc., Nene b; Peterboro', Nene c; Cosgrove, Ouse; Wakerley wood (Jones), Welland; Evenley, Cherwell; Drayton reservoir (Notcutt), Avon; var b *elongatum*, Rush mills; var c *Witheringii*, Delapre, Sywell, etc.

636. Galium uliginosum, L. Marshy places. Native. Local.

Foxhall, Nene a; Wittering, Nene c; Boro' Hill, Drayton reservoir (Notcutt), Avon.

639. Galium Aparine, L. Goose Grass. Hedges and waste places.

Abundant throughout the county.

640. Galium tricorne, With. Cornfields.

Wittering, Thornhaugh (Berkeley), Peterboro' (Paley), Nene c; Puseley, Ouse; overlooked doubtless in other districts, although not a common plant in this county.

641. Asperula odorata, L. Woodruff. Woods. Local and rare.

Sulby (Mort. Hist.), Avon; Whittlewood, Whistley wood, Ouse; Harleston, Badby wood (Notcutt), Nene a; Castle Ashby (Rogers), Nene b; Bedford Purlieus (Bodger), Yarwell (Mort. Hist.), Nene c.

The delicious hay-like scent of the dried plant is owing to the presence of Coumarin.

642. Asperula cynanchica, L. Quinsey Wort. Native. Calcareous ground. Local and rare.

Barnack, old Oundle road (Jones), Southorpe quarries, Nene c; Ufford Heath, Long Dike bank (Morton), Wakerley (Jones), Welland; dry pastures, Wappenham, Ouse; the last another of Miss Scott's interesting discoveries.

Formerly used as its name implies for Quinsies, its astringent property being probably useful.

643. Sherardia arvensis, L. Field Madder. Native. Cornfields, etc. Common and generally distributed.

King's Sutton, Cherwell; Boro' Hill (Notcutt), Avon; Potterspury, Ouse; Dallington, Nene a; Brafield, Nene b; Thornhaugh, Nene c; Ufford, Welland.

This genus was named by Dillenius, after Sherard, founder of the botanical professorship at Oxford.

*Valerianaceæ.*

645. Valeriana dioica, L. Marsh Valerian. Marshy places. Local.

Foxhall, Badby wood, Litchboro', Gayton, Nene a; base of Clifford hill, Easton Maudit, Billing (Ling), Nene b; Wittering, Nene c; Cosgrove (Furtho), Evenley Camp, Ouse; Drayton reservoir, Avon.

646. Valeriana officinalis, L. Valerian. Woods. Wet places. Native.

a. *Mikanii.*

Badby, Plain woods, Nene a; Yardley Chase, Nene b; Brigstock woods, Bedford Purlieus, Nene c; Whittlebury Forest, road side Plain park, Ouse; Wakerley (Jones), Welland.

b. *Sambucifolia.*

Canal banks near Hunsbury hill, Weedon, Nene a; Cosgrove, Ouse.

The Valerian possesses powerful medicinal agent, being used in hysterical cases with considerable success. Its action is principally due to the presence of an essential oil and a resin; the oil contains 70 % Valerol, which is easily changed into Valerianic acid by absorption of oxygen; it is an oily liquid, first discovered in dolphin's fat by M. Chevreul. It also occurs in the berries of *Viburnum Opulus.* The Valerianic acid of commerce is however prepared by the oxidation of fousel oil.

Valerian root has a most unpleasant odour due to the above acid, but however disagreeable to many people, it is peculiarly pleasant and attractive to cats.

648. Valerianella olitoria, Mœnch. Lamb's Lettuce. Native. Walls and calcareous soil.

Dallington, Kingsthorpe, Nene a; Midsummer Meadow, Overstone (Birch), Nene b; Thornhaugh, on rocky side of road, abundant; Peterboro' (P), Nene c; Culworth (Morton's Hist.), Avon.

*650. Valerianella auricula, D.C. Cultivated fields. Very rare.

Burton Latimer (Lewin), Nene b, is the only record. I have not seen it growing in the county.

651. Valerianella dentata, Koch. Dry cornfields. Not common.

Harleston, Brampton, Boro' Hill (Notcutt), Nene a; Yardley Hastings (Miss Brent), Nene b; Wittering, Peterboro' (P), Nene c; Roade, Wappenham (Miss Scott), Ouse; Croughton (French), Cherwell.

Dipsaceæ.

652. Dipsacus sylvestris, L. Teasel. Native. Stiff clay soils. generally distributed.

Harleston, Wootton, Harpole, etc., Nene a; Billing Road, Weston Favell, etc., Nene b; Brigstock, Benefield, etc., Nene c; Stoke Bruerne, etc., Ouse; Fineshade, Welland; Barby (Frost), Avon; Banbury (French), Cherwell.

653. Dipsacus pilosus, L. Native. Wet shady places. Rare.

Opposite Norton Park wall (Baker's Hist.), Nene a; plentiful by Easton brook (Miss Brent), Rothwell (Lewin), Nene b; Apethorpe (Berkeley), Nene c; Fineshade (Berkeley), Welland; Charwelton (Baker), Cherwell; Brook at bottom of Inlands (Notcutt), Avon.

654. Scabiosa succisa, L. Damp clayey ground. Native. Common and generally distributed.

Kingsthorpe, Gayton, etc., Nene a; Yardley Chase, Nene b; Wittering, etc., Nene c; Coppice Moor, Cosgrove, Pury Lodge var *alba*, Ouse; Banbury (French), Cherwell; Dunslade (Notcutt), Avon.

The root is a good example of the botanical term premorse.

655. Scabiosa columbaria, L. Native. Calcareous. Hedge banks, etc. Local.

Harleston, Brampton, Boughton, Nene a; Yardley Chase, Kettering (Lewin), Nene b; Southorpe, Nene c; Coppice Moor, Ouse; Collyweston Barnack, Ufford (Jones), Welland.

656. Scabiosa arvensis, L. Field Scabious. Cornfields.

Generally distributed and too common to need special localities.

Section of the "Margaritatus" zone of the Middle Lias of Northamptonshire. with approximate thickness of the beds.

1 Soft ferruginous limestone 3 feet.

2 Sandy clay 6 feet.

3 Soft ferruginous sandstone. 3 feet.

4 Sandy micaceous clay 4 feet.

5 Micaceous sandstone. 2 feet 6 ins.

6 Sandy micaceous clay 5 ft. 8 ins.

7 Hard Shelly limestone 1 ft. 4 ins. to 4 feet.

Blue clay

# NOTES ON LOCAL GEOLOGY.

## *Part VIII.*

### THE "MARGARITATUS" ZONE OF THE MIDDLE LIAS.

IN part vii. of these notes I gave a typical section of the "*margaritatus*" and "*spinatus*" zones of the Middle Lias for the W. and S.W. of Northamptonshire, making the "*margaritatus*" zone to consist of five beds. I have since visited some sections further northwards, and for these to be correctly represented it appears necessary to increase the number of beds in the "*margaritatus*" zone.

I was not in the least surprised to find that a typical section for the W. and S.W. of the county did not answer all requirements further northwards, because the Middle Lias is a formation which is extremely variable in the number and character of the beds composing it. Professor Judd, in his "Geology of Rutland," says, with regard to the Middle Lias, "no circumstance is more striking than the remarkable variations of the beds which compose it both in thickness and mineral character." I hope the explanation given above will be accepted as a sufficient excuse for again inserting a section of the "*margaritatus*" zone. (See opposite page.)

It will be seen, on reference to the diagram, that I have placed seven beds in the "*margaritatus*" zone, four of them being *hard* and three *soft*. It is these seven beds I now propose to describe a little more fully than I have yet done.

I wish it to be distinctly understood that this paper does not profess to be a treatise on the "*margaritatus*" zone of Northamptonshire, in which collected together all the information obtainable on the subject; it is almost entirely a record of my own observations on such sections as can now be seen. I know the list of fossils is a very incomplete one; and some exception may be taken to the typical section for a formation which is so variable in the number, lithological character, and thickness of its various beds. I have found such a section, however, very useful in my work, and the endeavour to identify beds has, in many instances, led to a more accurate investigation of them than I should otherwise have made. It is very probable the use of it by others will lead to a like result.

The typical section must be looked upon as giving the order of succession of the various beds in this district, and it does not follow that all, or

indeed any one of these beds, must be present in a section of the "*margaritatus*" zone. Of the four hard beds, I have reason to believe that the three lowest ones are entirely absent, at least as hard beds, in the neighbourhood of Northampton.

The lower part of the Middle Lias seems much more variable in character than the upper part. The uppermost bed of the Middle Lias, the *rock-bed*, has nearly the same character over a large area, and a thin band, resting upon the rock-bed, and never exceeding a few inches in thickness, is also persistent and similar over a large area, and this I take to be an indication of a very level surface at the time of its deposition; probably the reverse of this may account for the variableness of the bottom beds of the Middle Lias *(Survey division.)*

Below is a description of two sections of the Middle Lias, not before noticed in these papers, in which the "*margaritatus*" zone is represented.

SECTION AT STONE PIT, ABOUT A MILE-AND-A-HALF FROM DAVENTRY, TOWARDS BRAUNSTON.

| | | ft. | in. |
|---|---|---|---|
| 1. | Soil containing many pebbles from the drift ... | 1 | 6 |
| 2. | Irregular sandy bed, full of stones very much softer than those derived from bed below, and containing many fossils. Both the stone and the fossils very much like those obtained from beds Nos. 6 and 8 at Byfield. (See previous paper). Some of the stones very much worn ... ... ... ... | 1 | 6 |

Fossils :—*Belemnites*
*Modiola*
*Turbo cyclostoma ?*
*Ostrea*
*Avicula inæquivalvis. Small specimens abundant.*

The *modiola* is much more ferruginous than the other specimens, and is like those found in the ironstone nodules at Chalcomb.

| | | | |
|---|---|---|---|
| 3. | Hard compact rock, like that found at the base of the Marlstone at Chalcomb and Staverton. Very many fossils, but the stone so hard that they could not be got out without considerable trouble ... . . | 4 | 0 |

*Belemnites*
*Pecten æquivalvis (large)*
*Pleuromya (large), etc.*

Near to WATFORD LODGE there is a short tunnel on the new railway between Northampton and Rugby, and just at the entrance to the tunnel, either side, is a deep cutting exposing three of the hard beds of the Marlstone. The soft beds are now completely obscured by grass.

The following is the section as nearly as I could make it out; the measurements of the soft beds were made on the incline, and allowance afterwards made for an inclination of 35° to the horizontal.

SECTION ON THE LONDON & NORTH-WESTERN RAILWAY, NEAR TO WATFORD LODGE.

| | | ft. | in. |
|---|---|---|---|
| 1. | Soil, etc. ... ... ... ... ... | 3 | 0 |
| 2. | Calcareous and ferruginous sandstone, fissile, and abounding in fossils ... ... ... | 2 | 3 |
| | *Large Belemnites*<br>*Pectens*<br>*Protocardium truncatum*<br>*Cardita multicostata.* | | |
| 3. | Soft bed ... ... ... ... ... | 13 | 7 |
| 4. | Shaley, ferruginous limestone, bluish interior, very fossiliferous ... ... ... ... | 3 | 0 |
| | Fossils :—*Chemnitzia*<br>*Turbo*<br>*Ostrea*<br>*Pecten liasinus*<br>*Plicatula spinosa*<br>*Protocardium truncatum*<br>*Cardita multicostata*<br>*Cardinia ?*<br>*Astarte striato-sulcata*<br>*Pholadomya*<br>*Pleuromya costata*<br>*Serpulæ* (abundant in one part). | | |
| 5. | Soft bed ... ... ... ... ... | 19 | 6 |
| 6. | Rather soft, shaley, micaceous stone, also calcareous, and a little ferruginous, very much like bed No. 4 at Chalcomb ... ... ... ... | 3 | 0 |
| | Fossils :—*Pecten liasinus*<br>*Protocardium truncatum (fairly abundant)*<br>*Limea acuticosta (abundant)*<br>*Arca liasina ?*<br>*Fucoid markings (abundant).* | | |

Below this nothing can be seen, although the section extends to a further depth of 18 feet, but the bank is very wet in places.

I think beds Nos. 2 and 3 belong to the "*spinatus*" zone, and 4, 5, and 6 to the "*margaritatus*" zone.

In the village of NEWNHAM, by the side of the road which leads from Newnham to Daventry, one of the soft, sandy, and micaceous beds of the Middle Lias may be seen, which is probably bed No. 4 or 6 of the typical section. It contains *markings of fucoids* similar to those found at Watford, and these I have only found in the lower beds.

It is usual to consider the sighting of dark blue clay, below any part of the Marlstone, as an indication that the Lower Lias (*Survey division*) has been reached; and the numerous springs at the junction, or the swampy character of the ground below it, if flat, may be taken as almost equally good indications of the junction where it cannot be seen. The actual junction, and the other characteristics just mentioned may be well seen in STAVERTON GLEN.

For some time I was in doubt as to the character of the lowest bed of the Marlstone, for, although the hard shelly limestone (Bed No. 7) is certainly the lowest bed at STAVERTON, and there is good reason to believe it is also the lowest at CHALCOMB, I know a number of places where the blue clay is succeeded upwards by a sandy, light coloured clay. One of the best places for seeing this is at ELKINGTON, near to COLD ASHBY, in the deep valley at the base of Honey Hill. I have not in any of these cases, however, found bed No. 7 above such a section, or indeed any of the hard beds of the Middle Lias, and so I prefer to consider this arrangement of beds as an indication of the absence of bed No. 7, and possibly some of the other beds.

BED NO. 7.—This, the lowest bed of "*margaritatus*" zone of the Middle Lias of Northamptonshire, at least in the part I am now describing, is a hard shelly limestone, so hard and compact in fact where it is most fossiliferous, that it is difficult to get out any fossils or identify them. At CHALCOMB some portions of it are beautifully crystallized, the crystallized parts in every case being more or less associated with iron. In some specimens the ferruginous nature of the stone showed itself only in the crystals, but in most the stone seemed like an ironstone full of cavities, each of which had a crystal lining of carbonate of lime. Evidently water had percolated through this stone and given it the peculiar structure observed.

It frequently happens in limestone rocks that crystallized carbonate of lime is associated with coral, but I could get no evidence of coral in the stone just described.

The corresponding bed at STAVERTON is very similar in character; it is ferruginous, contains cavities, and crystallized carbonate of lime. The carbonate of lime is also found on the exterior of the stone as a non-crystalline incrustation, giving it a stalactitic appearance.

What I consider to be the same bed, near to Daventry, differs from the two just described in some respects. I found no distinct crystals in it, although it is very calcareous, but it is very hard, and is capped by the fragments of a bed which is readily identified as belonging to either 1 or 3 of the typical section.

I think this bed is entirely absent at Watford, certainly nothing like it is to be seen, and I have also reason to believe it is absent in the neighbourhood of Northampton.

At Staverton the bed is 1 foot 4 inches in thickness; at Chalcomb it is more than this, and at Daventry about 4 feet,

The fossils I have found in this bed are these :—

| | |
|---|---|
| *Belemnites* ... ... | *Staverton, Daventry.* |
| *Pecten æquivalvis (large)* ... .. | *Daventry.* |
| *Protocardium truncatum* ... ... | *Staverton.* |
| *Pleuromya* ... ... ... | *Daventry.* |
| *Tentacular fragments of Pentacrinite..* | *Staverton.* |
| *Small greenish pebbles* ... ... | *Staverton.* |

BED NO. 6.—This bed is a sandy clay or shale, yellowish brown in colour, micaceous, and ferruginous. The joints and surfaces are reddish in appearance, and at Chalcomb joints are very common. It does not effervesce with acids.

The material of this bed is very pervious to water, and when it is wet it readily crumbles down. In consequence of these properties most of the fossils are only casts of shells, and they are preserved with difficulty unless the material is dry when they are extracted, but they are very plentiful.

The thickness of this bed appears to be nearly 6 feet. I consider that the beds 2, 3, and 4 of the Chalcomb section, having an aggregate thickness of 5ft. 7in., all belong to this; the band of ironstone concretions (No. 3) not

being persistent, in fact I have not met with them at all in the "*margaritatus*" or "*spinatus*" zones further north.* At Staverton the bed is 5ft. 9in. in thickness; at Byfield and Watford I have been unable to ascertain the thickness.

The ironstone band at Chalcomb is a jumble of soft ironstone nodules, mixed with pebbles, and a reddish micaceous clay.

Fossils :—

| | | |
|---|---|---|
| From the soft bed. | *Ammonites margaritatus* .. ... ... Also many small specimens of ammonites which could not be identified, but probably all of them margaritatus. | *Chalcomb.* |
| | *Pecten æquivalvis ?* ... ... ... | *Chalcomb.* |
| | *Pecten liasinus* ... ... ... ... | *do.* |
| | *Pecten substriatus ?* ... ... .. | *do.* |
| | *Avicula inæquivalvis* ... ... ... | *do.* |
| | *Modiola numismalis* or *M. Scalprum* ... ... | *do.* |
| | *Protocardium truncatum* ... ... ... | *do.* |
| | *Ostrea submargaritacea ?* ... ... ... | *do.* |
| | *Arca liasina ?* ... ... ... ... | *do.* |
| | *Unicardium globosum* ... ... ... | *do.* |
| | *Pleuromya donnciformis ?* ... ... ... | *do.* |
| | *Arcomya hispida ?* ... ... ... | *do.* |
| From the ironstone concretions. | *Modiola* ... ... ... ... | *do.* |
| | *Astarte striato-sulcata* ... ... ... | *do.* |
| | *Arcomya hispida ?* ... ... ... | *do.* |
| | *Pectens or Aviculæ (plentiful)* ... ... | *do.* |
| | *Ammonites (many small specimens, but none identified)* | *do.* |

BED NO. 5.—This bed, although a well defined hard bed, differs very little in appearance and fossils from the two soft beds between which it is found. It is yellowish brown in colour, micaceous, and ferruginous, and when placed side by side with specimens from the softer bed below, it is scarcely possible to decide to which the two respectively belong without an appeal to the hardness.

There is one characteristic, however, which serves to distinguish this bed from those immediately above and below it, it effervesces with acids indicating the presence of carbonate of lime, whereas they do not, and

* Mr. Walford mentions the occurrence of ironstone concretions in the "*spinatus*" zone at Byfield.

I think there is no doubt that the presence of this calcareous matter, acting as a cement, has made it hard. It appears that for a short period, and over a limited area, an alteration took place in the nature of the deposit, although the regularity of the deposition was not interfered with.

It was the finding of this bed at Watford which caused me to alter my typical section. I found that this bed agreed much more closely with bed No. 4 of the Staverton section than any other I had seen; both were similar in appearance, both hard, and both very calcareous.

I cannot claim for these similarity of fossils because I was able to get so little from Staverton.

The alteration I have made in my typical section will necessitate bed No. 2 at Staverton being identified with bed No. 8 at Byfield, instead of No. 6, and I must say that this also is an improvement, though in the absence of other proofs, and bearing in mind the characteristic variation of these beds, I should not have made the change now noticed.

The thickness of this bed is about 2 feet at Staverton and nearly 3 feet at Watford.

The following are the fossils obtained from this bed :—

| | | |
|---|---|---|
| *Modiola* ... ... ... | *Watford.* | |
| *Limea acuticosta* ... ... | *Watford, Staverton.* | |
| *Protocardium truncatum (plentiful)* ... | *do.* | *do.* |
| *Pecten liasinus (plentiful)* ... ... | *Watford.* | |
| *Pentacrinite stems* ... ... | *Staverton.* | |
| *Fucoid markings (very abundant)* ... | *Watford.* | |
| *Arca liasina?* ... ... ... | *do.* | |

BED NO. 4.—I have not been able to examine this bed much, it is awkwardly situated at Staverton, and quite covered up at Watford, the only two places where I have come across it. It is very similar to bed No. 6 in appearance, but judging by the small quantity I got from Staverton not so micaceous, nor so fossiliferous.

The thickness of this bed at Staverton is about 4 feet, but, for reasons which will be evident on reading description of bed No. 3, I cannot give its thickness at Watford. I have not been able to get any fossils from this bed.

BED NO. 3.—The general character of this bed is that of a soft red sandstone abounding in fossils; it appears to be micaceous and calcareous in

some places, but not in others. At Byfield this bed has a thickness of 3ft. 3in., at Staverton 2ft. 9in., and at Watford I am inclined to think it is either absent, or so soft that it has been cut through with the other soft beds above and below it, and is now covered with grass. My reason for thinking that bed No. 4 of the Watford section is not the same as the one I am now describing rests on the facts that the stone at Watford contains a good deal of calcareous matter, in no part does it appear sandy, and the fossils agree better in kind and condition with those of bed No. 1 of the typical section. *Pleuromya costata* especially is very abundant in the bed at Watford and the top bed of the "*margaritatus*" zone at Byfield.

It will also be seen that there is less difficulty in accounting for the great thickness (19ft. 6in.) of the soft bed at Watford, if it really represents three beds, because these, if no thicker than those further south, would give about 13 feet.

Fossils :—

| | |
|---|---|
| *Ammonites margaritatus* ... ... | *Byfield.* |
| *Modiola numismalis? or Scalprum* ... | *do.* |
| *Pholadomya ambigua* ... ... | *do.* |
| *Pholadomya decorata* or *Simpsoni?* ... | *do.* |
| *Cardita multicostata?* ... ... | *Staverton, Byfield.* |
| *Protocardium truncatum* ... ... | *Byfield, Staverton.* |
| *Avicula inæquivalvis* ... ... | *Staverton, Byfield.* |
| *Goniomya heteropleura* ... ... | *Byfield.* |
| *Pitonillus conicus* or *Turbo aciculus* ... | *do.* |
| *Impressions of fucoids* ... ... | *do.* |
| *Crystallized carbonate of lime* ... ... | *do.* |
| *Pentacrinite stems* ... ... ... | *Staverton.* |

BED NO. 2.—This bed I have nowhere seen in situ, but from a specimen shown to me it appears to be a sandy clay or marl, of dark blue colour when first exposed, but getting lighter coloured on exposure, micaceous, and containing *Ammonites margaritatus*. Mr. Walford gives the thickness of this as 6ft. 2in. at Byfield, and describes it as a sandy marl, near Northampton it is, I think, about 6ft. 6in. in thickness.

BED NO. 1.—This bed is a sandy limestone, very similar to No. 3 but a little harder, reddish brown colour, rather shaley, and very fossiliferous. The fossils in this are better preserved than in any of the beds previously

described in this paper, with the exception perhaps of No. 7. The thickness of this bed is 3ft. 2in. at Byfield and nearly the same at Watford.

Fossils :—

| | |
|---|---|
| *Ammonites margaritatus (young specimens, abundant)* ... ... ... | *Byfield.* |
| *Belemnites and phragmacones* ... ... | *Byfield, Watford.* |
| *Chemnitzia?* ... ... ... | *Watford.* |
| *Turbo* ... ... ... ... | *do.* |
| *Ostrea sportella?* ... ... ... | *Byfield.* |
| *Ostrea sp.?* ... ... ... | *Watford, Byfield.* |
| *Plicatula spinosa* ... ... ... | *Byfield, Watford.* |
| *Pecten sp.* ... ... ... ... | *do. do.* |
| *Pecten liasinus* ... ... ... | *Watford.* |
| *Monotis (Avicula) inæquivalvis* ... ... | *Byfield.* |
| *Mytilus numismals* ... ... ... | *do.* |
| *Protocardium truncatum* ... ... | *Byfield, Watford.* |
| *Unicardium globosum* ... ... | *Byfield.* |
| *Cardita multicostata* ... ... ... | *Byfield, Watford.* |
| *Cardinia sp.?* ... ... ... | *Watford.* |
| *Astarte striato-sulcata* ... ... | *do.* |
| *Pholadomya ambigua* ... ... | *Byfield.* |
| *Pleuromya costata (abundant)* ... ... | *Byfield, Watford.* |
| *Pleuromya sp.?* ... ... ... | *Byfield.* |
| *Arcomya longa?* or *Arcacea?* ... ... | *do.* |
| *Arcomya hispida?* ... ... ... | *do.* |
| *Inoceramus substriatus?* ... ... | *do.* |
| *Serpulæ* ... ... ... ... | *Byfield, Watford.* |

## List of Fossils obtained from the "Margaritatus" Zone of the Middle Lias.

The numbers refer to the beds of the typical section in which each fossil has been found.

A query (?) is placed against a good many of the fossils, and where it appears there is either a little doubt about the specific name attached to it, or else the fossil was identified from the cast.

The names in italics are synonyms, and are chiefly taken from "The Yorkshire Lias," by Tate & Blake.

## CEPHALOPODA.

AMMONITES MARGARITATUS, *Amaltheus margaritatus* (Montfort), *Ammonites Stokesi (Sowerby), A. clevelandicus, A. Vittatus, A. subnodosus, A. nodulosus (Young & Bird), A. depressus, A. volutus (Mon. Am., 1843).* The reason why so many names have been used for this one species of Ammonite is because it takes such different forms, without however losing the characteristics by which it is identified as A. margaritatus. The change from youth to age seems to be consider able, and the oldest, judged of by their size, are the smoothest. (See figure). 1, 2, 3, 6.

BELEMNITES. I have found a few Belemnites in the beds of the "Margaritatus" zone, and some separated phragmacones, but have not been able to identify the species. 1, 3, 7.

## GASTEROPODA.

PITONILLUS CONICUS (D'Orb). I have one specimen of this gasteropod, I think, but without further cleaning up so as to expose the aperture it is impossible to say whether it is Pitonillus conicus or *Turbo aciculus.* 3.

TURBO CYCLOSTOMA ? (Benz). 1 or 3.

TURBO SP. ? This was, I think, *Turbo aciculus*, but could not certainly identify it owing to the injury it sustained in being extracted from the stone. 1.

CHEMNITZIA SP. ? 1.

## LAMELLIBRANCHIATA.

ORTREA SUBMARGARITACEA ? (Brauns). 6.

OSTREA SPORTELLA ? (Dumortier). 1.

This Ostrea approaches Gryphæa in its characters.

OSTREA SP. ? 1 and 3.

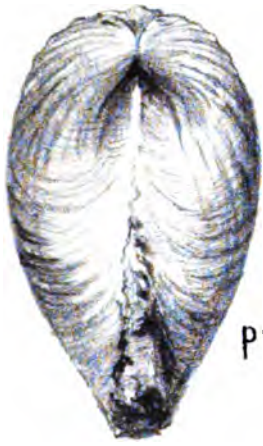
PECTEN LIASINUS (Nyst. Dunker, Oppel, &c.), *Pecten lunularis (Römer).* This is a rather abundant fossil in the "margaritatus" zone; it is a nearly circular and smooth pecten, sometimes found slightly striated. All the specimens I have found in this zone have been small. 1, 5, and 6.

n.s.

Ammonites margaritatus.

n.s.

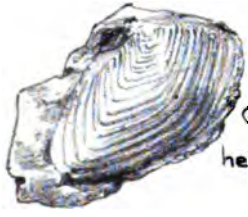
Pleuromya costata.



Phaladomya ambigua.
n.s.

n.s.

Avicula inæquivalvis.

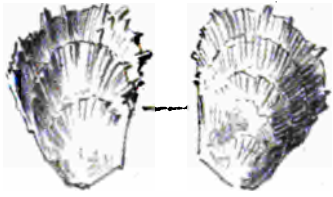


n.s.

Goniomya heteropleura.

n.s.

Protocardium Truncatum



plicatula spinosa
X 1½

Cardita multicostata.
X 2.

n.s. = natural size.

PECTEN SUBSTRIATUS? (Römer), *Pecten reticularis* and *Pecten punctatus* (Simpson). 6.

PECTEN EQUIVALVIS (Sowerby), *Pecten sublævis* (*Young & Bird, &c.*), *Pecten major* (Simpson, &c.) 6 and 7.

LIMEA ACUTICOSTA? (Münster), *Plagiostoma pectenoideum* (*Phillips, etc.*) 5 and 6.

PLICATULA SPINOSA (Sowerby). 1.

MONOTIS INÆQUIVALVIS (Sowerby), *Avicula inæquivalvis* (Sow.), *Avicula crescens* (*Young & Bird*), *Avicula novemcostæ* (*Brown, &c.*) 1, 3, 6.

INOCERAMUS SUBSTRIATUS? (Münster). 1.

MYTILUS NUMISMALIS? (Oppel), *Modiola numismalis* (Oppel), *Modiolus pygmæus* (*Simpson*). 1, 3, 5, 6.

MODIOLA SCALPRUM? (*Sowerby*), *Modiola siliqua* (*Young & Bird, etc.*) 1 and 3.

ASTARTE STRIATO-SULCATA (Römer), *Astarte amalthei* (*Quenstedt.*) 1 and 6.

CARDITA MULTICOSTATA (Phillips), *Cardium multicostatum* (Phillips and Simpson), *Cardita liasina* (*Moore*). 1, 3.

CARDINIA SP.? 1.

PROTOCARDIUM TRUNCATUM (Sowerby), *Cardium truncatum* (*Phillips & Sowerby*), *Cardium pectinatum*, *Cardium triangulare* (*Young & Bird*), *Cardium deltoideum* (*Young & Bird*). This is a very abundant fossil throughout the "margaritatus" zone, often a large number of specimens are found together. 1, 3, 5, 6, 7.

UNICARDIUM SUBGLOBOSUM (Tate), *Unicardium globosum* (*Moore.*) 1 and 6.

PHOLADOMYA AMBIGUA (Sowerby), *Pholadomya producta*, *Pholadomya recurva* (*Simpson.*) This is rather an abundant fossil. 1, 3, 5, 6.

PHOLADOMYA SP.? This is probably *P. decorata* (Zieten), or *P. Simpsoni* (*Tate*). 3.

ARCA LIASINA? 5 and 6.

GONIOMYA HETEROPLEURA (Agassiz), *Mya rhombifera (Quenstedt).* 1 or 3.

PLEUROMYA COSTATA (Young & Bird), *Myacites unioides* (Auctores, Auglicorum), *Mya ferruginea (Simpson).* This fossil is very abundant in those beds where I have found it at all. 1.

PLEUROMYA DONACIFORMIS ? (Phillips). 6.

PLEUROMYA SP. ? 7.

PLEUROMYA SP. ? 1.

CEROMYA SP. ? 6.

ARCOMYA LONGA ? (Buvignier), or ARCACEA ? (See back.) 1.

ARCOMYA HISPIDA (Simpson), *Mya hispida* (Simp.) 1 and 6.

## ANNELIDA.

SERPULÆ. 1.

## ECHINODERMATA.

PENTACRINUS SP. ? 3, 5, 7.

## PLANTÆ.

FUCOID MARKINGS. 3, 4, 5, 6.

In bed No. 3. the soft sandstone, at Byfield, I found a piece of stone full of stem-like bodies, which on shaking fell out, leaving in the stone round channels. There is little doubt that some form of plant had produced this structure.

In conclusion, I have to thank Mr. Walford, of Banbury, for naming a number of specimens for me; Mr. W. D. Crick, for a few specimens from Byfield that I had not procured myself; and Mr. S. J. Newman, for preparing the drawings which accompany this paper.

B. THOMPSON.

# ON NORTHAMPTONSHIRE AS A BOTANICAL DISTRICT.

By the Rev. M. J. Berkeley, F.L.S., F.R.S.

The distribution and richness of a Flora depend materially on the Geological formation and comparative altitudes of a country. In the latter respect we have little to notice. Before the late Geological Survey of the County under Mr. Judd, it was generally supposed that the Geology was as uninteresting as that of the neighbouring County of Huntingdon, but Mr. Judd has shewn us on the contrary that it is peculiarly complicated, as a glance at the map will at once convince us. Accordingly we might expect the Flora to be of much interest. Observations, however, confined to the strict limits of a particular district are apt to consist of mere dry details without any particular value, and accordingly, following the example of our President as regards the Ornithology of the district, it will be well not to confine ourselves to the limits of the County, but to give a glance to our neighbours, and accordingly if we take Wansford as a centre, we have a Flora peculiarly rich and abundant.

In the Oolitic districts we have rare Orchids, such as *Ophrys aranifera* and *Aceras anthropophora*, accompanied by *Hypochœris maculata* and *Anemone pulsatilla*. We have about Milton *Lythrum Hyssopifolium* and *Inula Helenium*, with *Melampyrum cristatum*. We have near King's Cliffe *Tilia parvifolia* undoubtedly wild, and when the underwood is cut at the proper period, the ground is perfectly blue with the common Columbine, where there is no habitation except an occasional keeper's lodge, and in the same woods a profusion of Lily of the Valley, and near at hand abundance of *Helleborus fœtidus*, while *Atropa Belladonna* is so thickly scattered that the herbalists and makers of extracts pay annual visits to collect it. In little marshy spots we have *Epipactis palustris*, *Parnassia palustris*, *Pinguicula vulgaris*, *Anagallis tenella*, and numerous species of *Carex*; and if we are allowed to cast our eyes beyond the county bounds, we find such varieties as *Liparis Loeselii*, *Andromeda polifolia*, *Viola lactea*, with *Teucrium Scordium* and other matters of interest, with such Ferns as *Aspidium cristatum* and *A. Thelypteris*; and if we are investigators of Cryptogams in general, the mosses and *Jungermanniæ* are numerous and rare, and we shall not fail to discover good plants of *Splachnum*—a genus rare except in mountainous districts. The thin soils about Thornhaugh abound with rare corn plants, such as *Silene noctiflora*, *Euphorbia platyphylla*, *and Caucalis Daucoides*,

not merely brought year by year by foreign seed, but to a certain extent established, and amongst them we shall not fail to find *Anagallis cærulea*, with such plants as *Thymus acinos*, *Stachys annua*, *and Linariæ*; and when the harvest has passed, the soil yields a host of mosses, especially of the tribe of *Phasca*, and amongst them *Phascum crassinervum*, figured from thence in the Scottish Cryptogamic Flora, by Dr. Greville. There is a patch of chalk drift at Biggin, in the parish of Oundle, where *Orchis ustulata* occurs, perhaps the only spot where it is found in Northamptonshire. But if variety of soil affords us an unusually abundant Flora, the large tracts of woodland, extending once from Wansford to Market Harborough, with many outlying inclosures, yield a never failing source of interest to the Cryptogamic Botanist in the variety of Fungi, and amongst them many of extreme rarity, of which I will only mention at present *Agaricus racemosus*, which on the same stem produces two different kinds of fruit, and *Agaricus Loveianus*, which is parasitic on the pileus of one of our best edible Fungi, *A. Nebularis*. To enumerate particular species would take up more space and time than would be consonant with the objects of our institution, and one of little interest except to those who make an especial study of Fungi. The very numerous additions which have been made to our list of species recorded by myself and Mr. Broome in the Annals of Natural History, amounting nearly to two thousand, have been supplied in great measure from these districts, and other parts of the county are daily yielding a fresh harvest, and it is not without interest while searching for them to find the rare *Gagea lutea* or *Lamium maculatum* apparently wild, in the coombes of Sibbertoft, with variously coloured forms of Primrose and Cowslip.

I turn rather to a very interesting class of Fungi, and of some importance in an economical point of view, viz., the Truffles, whether belonging to the normal group or to those which have been called false truffles—agreeing in their hypogæous habit, but differing altogether in structure. It was once thought that no esculent truffles were to be found in the County, except artificially introduced; their occurrence at Rushton in the early part of the last century was supposed to have arisen from trees introduced in the plantations from France, but I have seen *Tuber æstivum* in the greatest profusion at Apethorpe; and it is well known that the late Mr. Isted collected truffles in some abundance near Northampton. We do not possess at present the black truffle of France, but *Tuber æstivum* is not to be despised when in good condition, and indeed is almost the only kind which appears in the London markets, principally from the chalk districts. No one, as far as I know, has used truffle dogs systematically, with a view to ascertain how far the search of truffles in Northamptonshire would prove remunerative, as it does in Berkshire and Kent. I have seen truffles at Milton, and hear of

them elsewhere as at Normanton, in the neighbouring County of Rutland, and though I have myself had no help except the diligent use of the rake, I have found many species, and amongst them a very remarkable form abounding in a milky fluid. Amongst them only one is of sufficient size and of delicate flavour enough to make it worth collecting as a culinary article; but under the oaks at Rockingham the large white truffle, belonging to a distinct genus, has been found abundantly, and though not equal to the common summer truffle, it, or a closely allied species, is collected abundantly in the North of Africa, and Mrs. Lloyd Wynne, who has done so much for Mycology, saw it plentifully about Damascus, from whom I have received, through another source, a bag of dried specimens, prepared for food, and have partaken of the same when cooked, but I cannot say much in its favour, its merits depending more on the sauce than on itself, which may be also said of the red truffle (*Melanogaster ambiguus*) which is used in the neighbourhood of Bath. There is a fungus belonging to the order of Puff-balls, which is often found in Northamptonshire, and in some conditions closely resembles the smooth kinds of truffles externally, for which it may be easily mistaken without microscopical observation; and indeed, in Belgium, is often substituted for them in the manufacture of Paté de foie gras, an adulteration quite likely to escape observation, as it would require an expert to verify the substitution. While speaking of puff-balls I may mention that *Lycoperdon giganteum*, which grows to an enormous size, and which is so much esteemed in Italy, occasionally occurs in our pastures, and, if properly prepared, is no despicable morceau. Some of the starry puff-balls occur also, and are always much admired as curious objects when in perfection.

The very constant occurrence in this county of the red form of *Lychnis dioica* gives frequent opportunity of examining one of the most curious facts in Vegetable Pathology. It is well known that a parasitic Fungus (*Ustilago antherarum*) occurs abundantly in this species, and also in *Stellaria holosteum*. Monsieur Cornu first observed it in Paris, and afterwards Miss Lydia Becker brought the matter before the British Association at Exeter, but it seemed so extraordinary that it was not merely doubted but almost ignored as unworthy of notice. The fungus in question is perfected only in the anthers, but it attacks indiscriminatly male and female plants, and in the case of the latter as there are only minute rudimentary stamens, these are hypertrophied by the influence of the parasite to such an extent, that the anthers are at length fully developed, and thus a nidus is produced for the complete growth of the fungus. This I have verified in other parts of the county and in Wales, and indeed it may be observed with the utmost ease

every spring. The study of these parasites is becoming of more importance every year, as they act such a part in the diseases of our cultivated plants. One of the most curious, tho' not the most important instance, is that of the Hollyhock, which it is almost impossible to cultivate in perfection, as the plants are destroyed by one of these pests, and it is not sufficient to obtain seed from a district supposed to be free, as the seed itself is attacked by the fungus, as Mr. Worthington Smith has lately shewn. The history of its introduction is curious. It first came to Australia from Chili in another malvaceous plant, and from thence to this country; and, as has been often observed, plants which have a low condition of vegetation at home, when introduced into a foreign country, acquire an extraordinary luxuriance. Experiments at Calcutta show that the spores of many fungi are carried by the winds far and wide, and sometimes in a state of germination ready for propagation the moment they settle on a favourable spot. One curious species, which has been found on grass only in this country and in Cuba, was most abundant in the air at Calcutta. There is a curious seaweed-like fungus which is destroying pasture at Australia, from whence I had received it more than once from Baron Ferdinand Mueller; this has lately been found in great abundance in Sussex and with equal power of destruction. Some years since specimens were sent me of the fungus which occasions the dreadful disease, which is called the Fungus-foot of India. I was able to cultivate this to a certain extent on rice paste, but did not succeed in obtaining perfect fruit. I had stated this fact, with a certain amount of regret, at a meeting of the Linnæau Society of London, when Mr. Busk exclaimed "God forbid that you ever should," fearing that the disease might thus be introduced.

It is believed the Potato Fungus was introduced from Chili, the calamitous effects of which are almost incalculable. It was the cause of the loss of millions of money, but even more calamitously of an equal number of lives. It will perhaps be remarked that these observations have little to do with the distribution of plants in this county, but perhaps they may not on that account be the less acceptable.

I regret that the increasing infirmities of an octogenarian prevent my personal attendance at your meetings, but I have your prosperity at heart, and thank you for this opportunity of shewing that I am not unmindful of your kindness.

MILES JOSEPH BERKELEY.

# METEOROLOGICAL REPORT FOR JULY, AUGUST, AND SEPTEMBER, 1882.

THE fine weather which had characterized the latter part of June, and which had been of such good promise for agricultural operations, came suddenly to an end on the 2nd July, and from that date to the 11th rain fell in greater or less quantity every day very generally throughout the county. The rainfall of the 11th was the greatest in the month at 13 out of 14 stations, and at 11 stations exceeded 1 inch of measurement.

The Revd. H. Waller remarks that "a more disastrous hay harvest has never been known, and, unfortunately, the hurried and imperfect drying of the heavy meadow grass in the Nene valley, has led to many serious fires in rick-yards. No better opportunity could have been afforded for testing the value of Neilson's Hay Fans, and wherever they have been used the most marked and favourable results seem to be recorded." This statement, however, requires a little qualification, and it will perhaps be better to say that the fans have, in nearly all cases, proved to be sufficient to keep the temperature of the stacks under control, and so to prevent them from firing. The quality of the hay so secured is another matter; and if we may judge from the Royal Agricultural Society's trials of hay drying apparatus at Reading, the result of putting wet hay together in a hurry and trusting to the fans to dry as well as cool it, is hardly likely to be satisfactory. The latter part of the month was fine on the whole, with a few heavy local showers. The corn crops looked well, and were very little beaten down by the rain, as they would have been if it had been a fortnight later.

The first fortnight of August was beautifully fine and dry, without great heat, the maximum temperatures recorded being all under 80 degrees, with the exception of Pitsford. The corn ripened rapidly, and harvest became general about the 14th. Unfortunately at this time a series of depressions began which followed each other rapidly throughout the rest of the month, bringing with them heavy showers and unsettled weather. Fortunately the nights were cold and the general temperature too low for the grain to sprout, but the conditions were generally very unfavourable for the ingathering of the crops, and caused much delay and embarrassment.

The first few days of September continued to be very stormy and wet, but from the 6th to the 18th the weather was fine and dry, with very little wind, and slight fog in the mornings. Rain fell on the 19th nearly all day, and very heavily at night, particularly at Northampton, when 1·69 was measured by Mr. Law, while less than half the quantity fell at places near, viz :—·77 at Castle Ashby, ·75 at Weedon, ·72 at Pitsford, and ·77 at Fawsley. The storm which fell so heavily at Northampton seemed to have reached Little Houghton, when 1·21 fell, but it must have been confined to a small area, and was probably better employed in flushing the Northampton sewers than it would have been in soaking the unprotected corn stacks, very few of which at this time had been thatched. Heavy rain fell again on the 28th, but with this exception the remainder of the month was fine and seasonable.

# METEOROLOGICAL OBSERVATIONS, 1882.

## JULY, 1882.

| STATION. | OBSERVER. | RAINFALL. | | | | | SHADE TEMPERATURE. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total for Month. | Total for Year. | Greatest Fall. | | Wet Days. | Maximum. | | Minimum. | |
| | | | | In. | Date. | | Deg. | Date. | Deg. | Date. |
| Northampton .. | H. Terry ..... | 3·18 | 15·71 | 1·26 | 11 | 16 | 67 | 3, 30 | 48 | 26 |
| " .. | S. Law..... | 3·24 | 14·95 | 1·28 | 11 | 19 | 76 | 3 | 43 | 10 |
| Castle Ashby .. | R. G. Scriven..... | 4·18 | 17·83 | 1·37 | 11 | 20 | 75 | 27 | 47 | 27 |
| Weedon ..... | R. Capell ..... | 4·57 | 17·53 | 2·35 | 11 | 16 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 4·44 | 18·20 | 1·20 | 11 | 23 | 79 | 2 | 42 | 27 |
| Rothwell ..... | J. More, M.D..... | 3·36 | 13·90 | 1·13 | 11 | 21 | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | 3·48 | 15·07 | 1·63 | 11 | 11 | .. | .. | .. | .. |
| Towcester ..... | J. Webb ..... | 3·50 | 17·18 | 1·10 | 11 | 20 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 3·63 | 16·48 | 1·55 | 11 | 20 | 60 | 29 | 50 | 1 |
| Fawsley ..... | Lady Knightley.... | 3·33 | 15·44 | ·71 | 15 | 19 | 72 | 3 | 47 | 26 |
| Thorpe Man'ville | Seth Barnes ..... | 2·95 | 18·07 | ·58 | 11 | 18 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 4·27 | 15·99 | 1·30 | 11 | 18 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller..... | 3·33 | 18·03 | ·87 | 11 | 23 | .. | 3 | 42 | 30 |
| Haselbeach .... | E. T. Morgan..... | 3·24 | 16·53 | 1·19 | 11 | 13 | 73 | .. | .. | .. |
| Average 16 years 1866-81 ..... | H. Terry ..... | 2·76 | 13·84 | .. | .. | .. | .. | .. | .. | .. |

## AUGUST.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 1·47 | 17·18 | ·52 | 22 | 11 | 72 | 6 | 47 | 10, 11 |
| " .. | S. Law..... | 1·49 | 16·44 | ·52 | 22 | 12 | 78 | 8 | 41 | 24, 31 |
| Castle Ashby .. | R. G. Scriven..... | 1·79 | 19·62 | ·43 | 22 | 13 | 75 | 6 | 45 | 31 |
| Weedon ..... | R. Capell ..... | 1·85 | 19·38 | ·59 | 22 | 10 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 1·76 | 19·90 | ·67 | 23 | 15 | 85 | 12 | 41 | 21 |
| Rothwell ..... | J. More, M.D..... | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | 2·03 | 17·10 | ·55 | 21 | 10 | .. | .. | .. | .. |
| Towcester .... | J. Webb ..... | 2·07 | 19·25 | ·56 | 22 | 16 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 1·52 | 18·00 | ·49 | 22 | 14 | 60 | 2 | 44 | 29 |
| Fawsley ..... | Lady Knightley .. | 1·72 | 17·16 | ·48 | 22 | 14 | 76 | 6 | 45 | 28 |
| Thorpe Man'ville | Seth Barnes ..... | 1·89 | 19·96 | ·48 | 23 | 12 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 1·74 | 17·73 | ·58 | 23 | 12 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller ..... | 2·64 | 20·67 | ·58 | 22 | 15 | 77 | 6 | 35 | 10 |
| Haselbeach .... | E. T. Morgan..... | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Average 16 years 1866-81 ..... | H. Terry ..... | 2·48 | 16·33 | .. | .. | .. | .. | .. | .. | .. |

## SEPTEMBER.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 3·10 | 20·28 | 1·48 | 19 | 11 | 65 | 5 | 40 | 16 |
| " .. | S. Law ..... | 3·27 | 19·71 | 1·69 | 12 | 12 | 68 | 2 | 33 | 15 |
| Castle Ashby .. | R. G. Scriven ..... | 2·54 | 22·16 | ·77 | 19 | 12 | 69 | 3 | 41 | 7 |
| Weedon ..... | R. Capell. ..... | 2·38 | 21·76 | ·75 | 19 | 11 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 2·76 | 22·66 | ·72 | 19 | 13 | 72 | 10 | 32 | 15, 16 |
| Rothwell ..... | J. More, M.D ..... | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | 2·14 | 19·24 | ·84 | 28 | 9 | .. | .. | .. | .. |
| Towcester ..... | J. Webb ..... | 2·94 | 22·19 | ·93 | 19 | 13 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 3·33 | 21·33 | 1·21 | 19 | 11 | 57 | 25 | 36 | 13 |
| Fawsley ..... | Lady Knightley .. | 2·77 | 20·93 | ·77 | 19 | 17 | 70 | 16 | 32 | 15 |
| Thorpe Man'ville | Seth Barnes ..... | 3·76 | 23·72 | 1·04 | 19 | 15 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 3·02 | 20·75 | ·81 | 19 | 12 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller .... | 3·17 | 23·84 | 1·02 | 19 | 14 | 66 | 2 | 29 | 14 |
| Haselbeach .... | E. T. Morgan..... | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Average 16 years 1866-81 ..... | H. Terry ..... ... | 2·85 | 19·19 | .. | .. | .. | .. | .. | .. | .. |

HENRY TERRY, SURGEON.

# A SYSTEMATIC CLASSIFICATION OF THE LEPIDOPTERA WHICH HAVE OCCURRED IN THE VICINITY OF NORTHAMPTON.

By Wm. Hull and H. F. Tomalin.

## C—GROUP. BOMBYCES.

### Family I.—Lithosidæ.

#### Genus I.—Calligenia (Dup.)

*Species* 1...*C. Miniata* (Forst.) ...*Rosy Footman, Red Arches*
Locality.—Billing Magna, Yardley Chase, etc.

#### Genus II.—Lithosia (Fabr.)

,, 2...*L. Complanula* (Boisd.) ...*Common Footman*
Locality.—Harlestone Heath, Yardley Chase, Maidwell, Horton.
,, 4... ,, *Aureola* (Hübn.) ...*Orange Footman*
,, 1... ,, *Griseola* ,, ...*Dingy* ,,
,, 3... ,, *Molybdeola* (Guén.) ...*Leaden* ,,

#### Genus III.—Gnophria (Steph.)

,, 1...*G. Rubricollis* (Linn.) ...*Black Footman*
Locality.—Salcey Forest.

### Family II.—Arctiidæ.

#### Genus I.—Euchelia (Boisd.)

,, 1...*E. Jacobææ* (Linn.) ...*Cinnabar*

#### Genus II.—Nemeophila (Steph.)

,, 1...*N. Plantaginis* (Linn.) ...*Wood Tiger*
Locality.—Harlestone, Billing Magna.

#### Genus III.—Arctia (Shrank.)

,, 1...*A. Caia* (Linn.) ...*Tiger Moth*

#### Genus IV.—Spilosoma (Steph.)

,, 1...*S. Lubricipes* (Fabr.) ...*Buff Ermine*
,, 2... ,, *Menthrasti* (Linn.) ...*White*

#### Genus V.—Phragmatobia (Steph.)

,, 1...*P. Fuliginosa* (Linn.) ...*Ruby Tiger*
Locality.—Yardley Chase.

### Family III.—Liparidæ.

#### Genus I.—Orgyia (Ochs.)

*Species* 1...*O. Antiqua* (Linn.) ...*Vapourer*

#### Genus II.—Dasychira (Steph.)

,, 1[a]..*D. Pudibunda* (Linn.) ...*Pale Tussock*

#### Genus III.—Leucoma (Steph.)

,, 1...*L. Salicis* (Linn.) ...*White Satin Moth*

#### Genus IV.—Ocneria (Here-Schäff.)

,, 1...*O. Monacha* (Linn.) ...*Black Arches*

Locality.—Harlestone Heath, Salcey Forest.

#### Genus V.—Porthesia (Steph.)

,, 1...*P. Auriflua* (Linn.) ...*Gold-tail*

,, 2... ,, *Chrysorrhoea* ,, ...*Brown-tail*

### Family IV.—Cossidæ.

#### Genus I.—Cossus (Fabr.)

,, 1...*C. Ligniperda* (Fabr.) ...*Goat Moth*

#### Genus II.—Zenzera (Latr.)

,, 1...*Z. Æsculi* (Linn.) ...*Wood Leopard*

Locality.—Weston Favell, Houghton Magna, Northampton, Harlestone, etc.

### Family V.—Hepialidæ.

#### Genus I.—Hepialus (Fabr.)

,, 1...*H. Humuli* (Linn.) ...*Ghost Swift*

,, 2... ,, *Sylvanus* ,, ...*Wood* ,,

,, 3... ,, *Lupulinis* ,, ...*Common* ,,

,, 4... ,, *Hectus* ,, ...*Golden* ,,

### Family VI.—Saturnidæ.

#### Genus I.—Saturnia (Shrank.)

,, 1[b]..*S. Carpini* (Linn.) ...*Emperor*

Locality.—Roade.

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Of seventy-nine species of Bombycina we have recorded in the above list thirty-two species.

a The larvæ of this moth is exceedingly common in the hop districts. From the twelfth segment of the caterpillar there protudes a tuft of reddish hair, which certainly has some resemblance to the tail of a dog, hence the popular name Hop-dog.

b The cocoon which the larva of this species makes is a double one, a loose outer one enclosing a second, the inner cocoon being made of stronger hairs; the ends converging towards the opening, so that the imago when it emerges from the pupal case can escape, and no no other insect can get in.

## FAMILY VII.—LASIOCAMPIDÆ.

### GENUS I.—GASTROPACHA (Ochs.)

*Species* 1...*G. Quercifolia* (Linn.) ...*Lappet*

### GENUS II.—LASIOCAMPA (Shrank.)[c]

,, 1...*L. Potatoria* (Linn.) ...*Drinker*

,, 2... ,, *Quercus* ,, ...*Oak Eggar*

### GENUS III.—CLISIOCAMPA (Steph.)

,, 1...*C. Cratægi* (Linn.) ...*Pale Oak Eggar*

Locality.—Northampton.

,, 2... ,, *Populi* (Linn.) ...*December Moth*

Locality.—Northampton, etc.

,, 3... ,, *Neustria* (Linn.) ...*Tree Lackey*

### GENUS IV.—ERIOGASTER (Germ.)

,, 1...*E. Lanestris* (Linn.) ...*Small Eggar*

Locality.—Harlestone.

## D—GROUP. CUSPIDATES.[d]—Pseudo-Bombyes.

## FAMILY I.—DREPANULIDÆ.

### GENUS I.—CILIX (Leach.)

,, 1...*C. Spinula* (Westw.) ...*Chinese Character*

Locality.—Salcey Forest, etc.

### GENUS II.—PLATYPTERYX (Lesp.)

,, 1...*P. Falcula* (Linn.) ...*Pebble Hook Tip*

Locality.—Yardley Chase, Salcey Forest, etc.

## FAMILY II.—NOTODONTIDÆ.

### GENUS I.—PHALERA (Hübn.)

,, 1[e]..*P. Bucephala* (Linn.) ...*Buff Tip*

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c The larvæ of this genus are thickly covered with hairs, hence the family name Lasiocampidæ, which signifies hairy caterpillars.

Of thirty-three British species of Cuspidatira we have recorded in the above list thirteen species.

d In the larvæ of most of the species in this group, the segments instead of being rounded as in most caterpillars, are prolonged, so as to produce several projecting points, or cusps, hence the name Cuspidates applied to this group.

This group is divided by some authors among the Bombyces and Noctuæ.

e The name of Bucephala, bull-headed, is given to this species from the position of the imago when in repose.

GENUS II.—CERURA (Shrank.)

*Species* 1...*C. Vinula* (Linn.) ...*Puss Moth*
Locality.—Houghton Magna, Northampton, etc.

,, 2... ,, *Bifida* (Hübn.) ...*Barred Kitten*
Locality.—Northampton, Wellingborough.

,, 3... ,, *Furcula* (Linn.) ...*Kitten*
Locality.—Northampton, Castle Ashby.

GENUS III.—PTEROSTOMA (Germ.)

,, 1...*P. Palpina* (Linn.) ...*Pale Prominent*
Locality.—Salcey Forest.

GENUS IV.—LOPHOPTERYX (Steph.)

,, 1...*L. Camelina* (Linn.) ...*Coxcomb Prominent*

GENUS V.—LEIOCAMPA (Steph.)

,, 1...*L. Dictæa* (Linn.) ...*Swallow Prominent*
Locality.—Northampton, Wellingborough.

,, 2... ,, *Dictæoides* (Esp.) ...*Swallow-likeness Prominent*
Locality.—Northampton.

GENUS VI.—DRYMONIA (Hübn.)

,, 1...*D. Chaonia* (Wien Verz.) .. *Lunar Marbled Brown*

GENUS VII.—PETASIA (Steph.)

,, 1...*P. Cassinia* (Steph.) ...*Sprawler*
Locality.—Hardingstone.

GENUS VIII.—DILOBA (Boisd.)

,, 1...*D. Cæruleocephala* (Linn.) ...*Figure of 8 Moth*

## E—GROUP. NOCTUÆ. *f*

### SECTION I.—TRIFIDÆ.

### BOMBYCIFORMES.

### FAMILY I.—CYMATOPHORIDÆ.

GENUS I.—GONOPHORA (Braund.)

,, 1...*G. Derasa* (Linn.) ...*Buff Arches*
Locality.—Billing Magna, Wellingborough.

*f* This group of British Lepidoptera is only rivalled in point of numbers by the Tineina, the group alone comprising nearly five times as many species as there are of British Rhopalocera; the main portion of this group are so devoid of characteristic markings that it is with difficulty they can be determined.

GENUS II.—CYMATOPHORA (Treit.)

*Species* 1...*C.* *Ocularis* (Linn.) ...*Figure of Eighty*
Locality.—Whittlebury Forest.
,, 2... ,, *Duplaris* (Linn.) ...*Lesser Satin Moth*

GENUS III.—ASPHALIA (Hübn.)

,, 1...*A.* *Diluta* (Wien Verz.) ...*Lesser Lukestring*
,, 2... ,, *Flavicornis* (Linn.) ...*Yellow Horned*
Locality.—Whittlebury Forest.
,, 3... ,, *Ridens* (Fabr.) ...*Frosted Green*

FAMILY II.—ACRONYCTIDÆ.

GENUS I.—CRANIOPHORA (Snell.)

,, 1...*C.* *Ligustri* (Linn.) ...*Coronet*

GENUS II.—ACRONYCTA (Ochs.)

,, 1...*A.* *Leporina* (Linn.) ...*Miller*
,, 2... ,, *Alni* ,, ...*Alder*
Locality.—Whittlebury Forest, Northampton.
,, 3... ,, *Tridens* (Wien Verz.) ...*Dark Dagger*
,, 4... ,, *Psi* (Linn.) ...*Grey* ,,
,, 5... ,. *Menyanthidis*(View.) ...*Light Knot Grass*
Locality.—Northampton.
,, 6... ,, *Auricoma* (Wien Verz.)...*Scarce Dagger*
Locality.—Whittlebury Forest.
,, 7... ,, *Rumicis* (Linn.) ...*Knot Grass*
,, 8... ,, *Megacephala* (Wien Verz.) ...*Poplar Grey*
,, 9... ,, *Fibrosa* (Hübn.) ...*Crescent*

GENUS II.—BRYOPHILA (Treit.)

,, 1...*B.* *Perla* (Wien Verz.) ...*Marbled Beauty*
,, 2... ,, *Glandifera* ,, ... ,, *Green*
Locality.—Whittlebury Forest.

GENUINÆ.

FAMILY III.—LEUCANIDÆ.

GENUS I.—MONAGRIA (Hübn.)

,, 1...*N.* *Typhæ* (Esp.) .. *Bull-rush*
Locality.—Northampton, Wellingborough.

GENUS II.—MELIANA (Curt.)

,, 1...*M.* *Flammea* (Curt.) ...*Flame Wainscot*

GENUS III.—CALAMIA (Led.)

*Species* 1...*C. Crassicornis* (Haw.) ...*Large Wainscot*
Locality.—Whittlebury Forest.

GENUS IV.—LEUCANIA (Ochs.)

,, 1...*L. Pallens* (Linn.) ...*Common Wainscot*
,, 2... ,, *Impura* (Hübn.) ...*Smoky* ,,
Locality.—Northampton.
,, 3... ,, *Straminea* (Treit.) ...*Streaked Wainscot*
Locality.—Whittlebury Forest.
,, 4... ,, *Obsoleta* (Hübn.) ...*Obscure Wainscot*
Locality.—Whittlebury Forest.
,, 5... ,, *Comma* (Linn.) ...*Shoulder-striped Wainscot*
,, 6... ,, *Littoralis* (Curt.) ...*Shore* ,,
Locality.—Whittlebury Forest.
,, 7... ,, *Phragmitidis*(Hübn.) ...*Small Wainscot*
*Pallida (var.)* ,, ... ,, ,,
Locality.—Northampton.
,, 8... ,, *Lithargyrea* (Esp.) ...*Clay*

FAMILY IV.—CARADRINIDÆ.

GENUS I.—CARADRINA (Treit.)

,, 1...*C. Morpheus* (Hufn.) ...*Mottled Rustic*
Locality.—Northampton.

GENUS II.—GRAMMESIA (Steph.)

,, 1...*G. Trilinea* (Wien Verz.) ...*Treble Lines*
Locality.—Northampton, Wellingborough, Whittlebury Forest.

GENUS III.—DICYCLA (Guén.)

,, 1...*D. Oo* (Linn.) ...*Scalloped-wing Oak Moth*
Locality.—Salcey Forest.

GENUS IV.—ANCHOCELIS (Guén.)

,, 1...*A. Lunosa* (Haw.) ...*Lunar Underwing*
Locality.—Whittlebury Forest.

GENUS V.—RUSINA (Boisd.)

,, 1...*R. Tenebrosa* (Hübn.) ...*Brown-feathered Rustic*

*(To be Continued.)*

## MEETINGS.—AUGUST, 1882.

On Tuesday, the 1st, a meeting of the Botanical, Microscopical, and Ornithological sections was held in the Curators'-room, Guildhall.

Mr. R. Rogers contributed a paper on the Hypericums (St. John's Worts), which described their pecularities, and especially noting the folk-lore connected with the plants; it was illustrated by numerous specimens.

A paper, contributed by the Revd. M. J. Berkeley, F.L.S., F.R.S., on "Northamptonshire as a Botanical District," was then read (See page 159.)

Mr. H. F. Tomalin noted having observed a "Green Sandpiper" that day.

On the 15th, there was a meeting of the three sections—Geology, Entomology, and Meteorology. Messrs. W. H. Killick, W. Marriott, W. H. Todd, and the Revd. Peake Banton were elected members. A paper received from Mr. B. Thompson was read, describing the geology of a part of Staffordshire, in the Trias system, covered with a thin layer of drift, in the form of gravel or boulder clay, containing pebbles of quartz and green-stone; the chief formation is Keuper, containing footprints of birds; immediately under are the water-stones of the Keuper and compact sandstones, having footprints of the Dinotherium, of which Mr. Thompson secured specimens.

Mr. H. J. Eunson exhibited some fossils—Ammonites, Belemnites, &c., and stag's horn, from the new boring at Gayton. Mr. Rogers recorded finding Lotus tenuis near Easton Maudit.

## SEPTEMBER.

A meeting of the Botanical, Microscopical, and Ornithological sections was held on the 5th. Various specimens were brought for exhibition. Two papers were read, contributed by Mr. Rogers—"Botanical Finds in 1882," and "On White Varieties of Flowers." It was noted that yellow flowers are but little subject to variation, whilst those plants bearing blue, purple, or pink blossoms frequently produce white flowers, though there are many exceptions to this rule, such as the primula. The cultivated varieties of the latter often exhibit every shade of colour, from the normal type (yellow) to white, pink, and even red, and this peculiarity may occasionally be observed in the wild kinds, though to a very slight extent. Mr. Rogers instanced, among many others, having found a plant of the spiny rest-harrow, at Easton Maudit, with lovely pure white flowers. The common meadow clover and the knapweed were noticed at Castle Ashby bearing

white flowers, and the wild basil at Yardley Hastings. The milk wort, ragged robbin, and wild hyacinth were also noted as having been seen as albinos. Mr. W. D. Crick exhibited several shells in the microscope—*helix aculeata* and others. Mr. S. J. Newman exhibited specimens of the parasites on sticklebacks—*argulus feliaceus*—showing one in the microscope. One stickleback had four of these attached to it, varying from 3-16ths of an inch long to smaller sizes. They adhere by means of two suckers and a carapace. The whole of the insect fits so closely to the fish that it is hardly possible for them to free themselves from these parasites. Mr. F. Law also exhibited skeletons of birds' heads.

On the 19th, a meeting of the Geological, Entomological, and Ornithological sections was held. Lady Lyveden, of Laundimer House, and the Revd. E. M. Moore, Benefield Rectory, Oundle, were elected members. Various entomological specimens were exhibited. Mr. Elkington showed various Hawk-moths and foreign insects, and reported having found larvæ of the Fox-moth (Lasicampa rubi), and caught, on August 29th, on the Racecourse, a Midsummer Cockchafer (Zantheumia Solstitialis); these are not usually met with after July.

Mr. H. J. Eunson exhibited a large portion of the trunk of a willow, containing besides several larvæ of the Goat Moth (Cossus ligniperda), about a dozen larvæ of the Hornet Clear-wing (Trochilium apiformis). A nest of the golden spider was also shown, found by Mr. Rogers.

Mr. B. Thompson gave a description of the Ammonite Margaritatus Zone of the Middle Lias, explaining the lithological characters of the beds into which the zone may be divided, and enumerating the fossils found in each, chiefly as noted near Newnham, Chalcomb, Watford, Elkington, and Helidon.

## EARLY APPEARANCE OF THE RING OUZEL IN NORTHAMPTONSHIRE.

In the last week of August of the present year there was shot at Hazelbeach, in this County, a Ring Ouzel, *Turdus Torquatus (Linn.)* As the few specimens of this bird that pass through the country in their autumnal migration generally arrive here the first week in October, the appearance of this specimen at so early a date is unusual.

The bird was a male in mature plumage.

H. F. TOMALIN,
Northampton.

JUDITH, OR COWPER'S OAK.

Drawn by the [illegible] Engraved by [illegible] Coltsmire from a Sketch by
[illegible]

## TREES OF NORTHAMPTONSHIRE. XII.

### "JUDITH," OR COWPER'S OAK.

THOU wast a bauble once, a cup and ball
Which babes might play with; and the thievish jay
Seeking her food with ease might have purloined
The auburn nut that held thee, swallowing down
Thy yet close folded latitude of boughs
And all thine embryo vastness at a gulp.
But Fate thy growth decreed. * * *
* * * * * * *
Time made thee what thou wast, king of the woods;
And Time hath made what thou art, a cave
For owls to roost in. Once thy spreading boughs
O'er hung the champain; and the numerous flocks
That grazed it stood beneath that ample cope
Uncrowded, yet safe sheltered from the storm.
No flock frequents thee now. Thou hast outlived
Thy popularity, and art become
(Unless verse rescue thee awhile) a thing
Forgotten, as the foliage of thy youth.

COWPER. *Yardley Oak*, 1791.

THE poet who penned the above lines would have been astonished if he could have foreseen their result. He seems to have thought it possible that his verse might, for a short time, call attention to the ancient tree about which he wrote; but he must have been far from imagining that this tree which had from immemorial tradition borne the name of "Judith" should, in a few years, become so inseparably connected with his memory as to bear his name, and should be so far from being forgotten as to be, nearly a hundred years after his death, the best known and most frequently visited of all the trees in Northamptonshire.

And if he could have foreseen that this unwonted popularity brought with it unwonted dangers; and that many of those who came in his name, but not in his spirit, had so little reverence for the ancient ruin he so much admired as to bring with them saws, and knives, and axes, to break off and carry away portions of its trunk, until the owner of the land was obliged to threaten them with the terrors of the law; he would perhaps have preferred to leave it in its safe obscurity, to be "whittled away" only by the "sly scythe" of Time. Cowper's Oak may well ask to be saved from its friends.

The origin of the name of "Judith" is lost in obscurity. All that is certain is that this portion of Yardley Chase formed part of the vast possessions of the Countess Judith, the niece of William the Conqueror. It has been conjectured that the tree was planted by her own hand, but it seems most likely that it may have been chosen as a young and thriving tree to serve as a landmark before the country was enclosed, and this is the more probable as it stands very near the boundary of the county.

Yardley Chase is mentioned in "Domesday," when the Countess Judith held of the King three hides and a half in "Gerdelai." The arable land was nine carucates. One hide and three carucates were in demesne; and sixteen villanes and twelve cottagers had six carucates. There was a wood thirteen furlongs in length, and eight furlongs in breadth. It came into the possession of the Compton Family in the reign of Henry VIII., in the twentieth year of whose reign "died Sir William Compton, seized of the Manor, Park, and Chace of Yardley Hastings, and advowson of the Church, with forty messuages, forty tofts, one thousand acres of arable land, one thousand acres of meadow, one thousand acres of pasture, and two thousand acres of wood." This Sir William Compton was the direct lineal ancestor of the present owner, the Marquis of Northampton. The earliest mention of the name of "Judith" in connection with the tree which I have been able to discover is in the title of an old print, shewn to me by Mr. John Taylor, in which it is called "Judith," or Cowper's Oak. This is stated to be from a drawing by Mr. Moore, and is dated 1804.*

The tree is still healthy and vigorous, and has every year abundant foliage, and, in suitable seasons, a good crop of acorns. Allowance must be made in reading the poem for a certain amount of poetic licence, as it is there described as being more shattered than it really is, probably for the sake of heightening the contrast. Neither can it be strictly called "a giant bulk—of girth enormous," as in size it is no way exceptional. Brought to the prosaic test of the tape it measures 22 feet 11 inches in circumference at 3 feet from the ground, and at 5 feet, 23 feet 4 inches. Its ancient traditions however, combined with more modern associations, make it more than usually interesting.

The photograph was taken in September, 1882.

* Since the above was in type I have found an earlier reference, in Cowper's own hand. In a letter to Samuel Rose, dated from Weston, September 11, 1788, he says "this latter oak has been known by the name of 'Judith' many ages, and is said to have been an oak at the time of the Conquest."—*Works of W. Cowper, Life and Letters, by William Hayley*, 1835.

# NOTES ON THE BIRDS OF NORTHAMPTONSHIRE.

By Lord Lilford, F.L.S.

85. Twite. *Linöta montium.*

As far as our own experience goes, this bird is an irregular and uncommon visitor to Northamptonshire, only making its appearance with us in very severe weather; but Mr. W. L. Chapman, whom I have previously quoted concerning the Lesser Redpoll, informs me that many Twites visited the neighbourhood of Northampton during the early winter of 1880; and I gather from his letters that he does not consider it as an uncommon autumnal visitor in that part of the county. In general habits this bird much resembles the Common Linnet; but its distribution during the breeding-season in our islands is much more local, as it especially affects open moorlands, and often nests on the ground in those localities, and, as a rule, only appears in the wooded and cultivated lowlands as an autumnal bird of passage. Our own acquaintance with the Twite, or, as it is often called, the Mountain Linnet, is chiefly confined to having often met with it on the moors of Scotland, Yorkshire, and Cheshire, when Grouse-shooting, in the months of August and September. At that season it is generally to be met with in small family-parties of six or eight, flitting about grassy spots amongst the heather, and feeding on various small seeds. It may be distinguished, even at some distance, from the Common Linnet on the wing by its lighter make, darker colour, and sharp call-note. In captivity this species becomes very tame, but has not much to recommend it, as the song though sweet is short, broken, and of little power. We have never personally found the nest of the Twite, which is said to be built of fibrous roots or twigs, grass, moss, and wool, and usually lined with feathers, hair, or fur; the eggs are generally five, and very closely resemble those of the Common Linnet.

86. Bullfinch. *Pyrrhula vulgaris.*

This well-known and handsome species is very common in our neighbourhood, and though never, to my knowledge, met with in numbers sufficient to justify the name of a flock, may certainly be considered one of the most typical birds of our district. In the autumn and winter months, the old rough fences so common in this county supply the Bullfinch with an abundance of its favourite food in the shape of hips, haws, and many other berries; and on such fences it may be found, and closely observed in small

parties of seven or eight, which follow the line of hedge, busily feeding, and calling to one another with a low single note. At the approach of spring these birds come into our kitchen-gardens and orchards and commit great ravages on the early buds of the gooseberry and other fruits. It appears somewhat doubtful whether the Bullfinch in any way makes amends for the mischief thus committed, by the destruction of any injurious insect. This is a point which I would strongly recommend to the consideration and investigation of such of my readers as may have the opportunity, for the Bullfinch is a very favourite bird of mine, and a great ornament to our gardens and shrubberies. The nest and eggs of this species are so peculiar and well-known that I think it superfluous to describe them here; a very favourite site for the nest, in this neighbourhood, is a thick young yew-tree or a dense box-bush, but it may be met with in almost any quiet place with thick covert. The hen bird sits very close, and may often be taken on the nest. The natural song of the Bullfinch is not a brilliant, but, to my taste, a very pleasing performance, and infinitely preferable to the "piping" of tunes artificially taught. This species is, from its extreme docility and beauty, a very favourite cage-bird in this country and on the continent, and with proper care will live and thrive for many years in confinement, and has often been known to breed in that state. My friend Mr. Holden Hambrough, of Pipewell Hall, Kettering, has kindly supplied me with particulars concerning a pair of Bullfinches, which, being allowed their liberty in Mrs. Hambrough's sitting-room, have, for two successive seasons, nested and reared their brood in the skull of a deer which hangs over a door. There is a prevalent story in our neighbourhood that if a brood of young Bullfinches is taken and placed out of doors in a cage the parent birds will poison all but one of their progeny; but, in common with a good many other bird-stories, this very much "requires confirmation." Several instances of melanism in this species have come to my knowledge in Northamptonshire and elsewhere; it is, I believe, supposed that an exclusive course of hempseed as food will produce this effect. The Bullfinch is found in most parts of Central Europe, Northern Italy, and France. In Spain I have only met with it sparingly in the province of Santander, whilst it appears that in Northern and probably Eastern Europe its place is occupied by an almost precisely similar but larger form or species, viz., *Pyrrhula major*. Of this latter bird I have kept several in confinement, and can perceive no difference in note or habits from those of our common Bullfinch: but I am informed that they will not learn to pipe.

87. CROSSBILL. *Loxia curvirostra.*

Our old Northamptonshire naturalist Morton, at p. 427 of his book

previously cited, writes as follows :—"The Shell-Apple or Crossbill, *Loxia Gesneri*. This bird has been shot at Fawsley, and is the only one of the kind I have met with here." I have not myself met with this bird in our county, but have several notes of its occurrence therein from various sources The Rev. M. Berkely, in a letter dated February 28, 1876, states that "the Crossbill was not uncommon at Milton;" and I was informed by Lady Mary Thompson that several were shot there in the early part of the winter of 1822-23. Mr. A. G. Elliott informs me that several have been killed near Stamford at various times. Mr. J. Hensman mentions a specimen shot at Irchester, November, 1866, now in the Northampton Museum; and Mr. W. L. Chapman, writing in January, 1881, tells me that a great number of Crossbills were about Harlestone Firs some years ago. This species is an irregular visitor to most parts of Great Britain. It is recorded by Professor Newton, in the fourth edition of Yarrell's 'British Birds,' as having been known to nest in seventeen English counties; but in most parts of the country it is regarded as a winter migrant, though to this there are many exceptions, *e.g.* one to our knowledge in which large numbers of Crossbills appeared in the month of June in the neighbourhood of Holsworthy, in North Devon. This species is essentially a denizen of the fir woods, the seeds of the various conifers forming its principal and favourite food. The Crossbill breeds frequently and regularly in many parts of Scotland, and, according to frequent observers, usually commences its nesting-operations early in March, for the most part selecting the horizontal bough of a fir; but on this subject we can only speak on the authority of others, and therefore abstain from any details except to mention that a nest taken in Scotland, and sent to me with four eggs some years ago, is built of twigs of Scotch fir and lined with coarse grass and a very little wool. The Crossbill is more or less common in suitable localities in all parts of Europe. We have met with it in great abundance in the Canton de Vaud, Switzerland, from November till April, but could not succeed in finding a nest. In Spain we met with it in the month of June, in the pine-forests of the Guadarrama mountains, near San Ildefonso, and have heard of its occurrence in many parts of that country. We have generally found the Crossbill very tame and easy of approach, and a flock of these birds busily employed in feeding on the seeds of a snow-laden fir-tree is a beautiful and most interesting sight. Their actions in quest of food very much resemble those of the smaller Parrots as they cling to and clamber about the large cones, from which they extract the seeds with wonderful rapidity. In confinement we have found this species, though it soon becomes perfectly tame, invariably very restless, and constantly climbing over all parts of its cage as if seeking to escape. As above mentioned, fir-seeds are the natural and favourite food;

but these birds will readily feed on hemp-seed and almost any of our common berries. At pp. 190, 191, of the fourth edition of Yarrell's 'British Birds' will be found some quaint quotations from two authors concerning the visitation of Crossbills to this country in the years 1251 and 1593, and the damage done by them in the apple-orchards by boring into the fruit to extract the pips. In connection with this we may state that although we have found our tame birds of this species very fond of the pips of apples, we never could induce them to extract the said pips from the fruit for themselves. The plumage of the Crossbill varies, according to age and sex, from a yellowish grey with brown stripes in the nestling birds to an almost uniform dull red in adult males, and a general yellowish green in the females; the long wing-feathers and tails are always brown, though the shades of this colour vary considerably. We have found that in captivity the red birds invariably lose that colour at the moult, assuming a plumage of what, for want of a better expression, we may term a brownish green, and never regaining their brighter dress. The ordinary call of this species is a loud single note frequently repeated, but both sexes have a pleasant murmuring sort of song.

88. STARLING. *Sturnus vulgaris.*

As may well be supposed in a district so eminently suited to its habits, this well-known bird is exceedingly abundant with us, and we presume that there is hardly a Northamptonshire man, woman, or child who is not more or less acquainted with the "Starnel," as it is commonly called by our country people. We do not therefore propose to enter into any lengthy details as to its habits, which have been fully and frequently described by far abler pens than ours; but perhaps a few observations from our experience in our own neighbourhood may possess some interest for Northamptonshire readers, for whom these notes are specially designed. Some thirty years ago several small spinnies of blackthorn, with a few fir-trees in each, were planted in a large pasture-field adjoining the park at Lilford, and two of these plantations, when the blackthorns had attained a height of some eight or ten feet, were selected as winter roosting-places by myriads of Starlings, which deserted for that purpose several older plantations in the neighbourhood. The numbers of these birds crowding into these small coverts at dusk from the end of September till March was astonishing, and seemed to increase annually for some eight or ten years, when the flocks suddenly abandoned these haunts, and since that time, though a few Starlings still come in to roost, and although this species is certainly as abundant with us as ever, I do not think that I am wrong in stating that the evening flights at the spots above mentioned may now be reckoned by

tens instead of by thousands as formerly. This habit of suddenly forsaking a favourite roosting-haunt has often been noticed, but, as far as I know, never satisfactorily accounted for. We look upon the Starling as one of the most useful to man of our British birds; the manner in which these birds will clear a turnip-field attacked by "fly" of this pest has several times come under our especial notice, and is truly marvellous; and although accusations against the Starling of depredations amongst various fruits are not wanting, I never heard any gardener in our neighbourhood speak of it as an enemy. Insects of all kinds form its principal diet, and small parties of Starlings may frequently be seen in calm hot weather hawking slowly high in air in a fashion that has put us somewhat in mind of the habits of a very different species—the Bee-eater, *Merops apiaster*, as observed in Spain and other parts of Southern Europe. As soon as the young are strong on the wing these birds collect in small flocks, and are often closely waited upon of an August evening by the Hobby, *Falco subbuteo*, who seems to have a special liking for this game. The great majority of our home-bred Starlings leave us early in autumn; but their places are soon occupied by strangers, who remain or pass on according to the weather. This species, as might be expected from the nature of its food, is one of the first to suffer from a sudden severe frost; and we have often picked up Starlings dead or dying about our spring heads after a few days of such weather. The Starling, besides an infinite variety of natural notes, possesses the power of close imitation of those of many other birds. One which haunted the roof of the house at Lilford deceived me many times with an exact imitation of the cry of the Kestrel, and others at various times with that of the chatter of the Fieldfare, the whistle of the Golden Plover, and the cry of the Alpine Chough *Pyrrhocorax alpinus*, which they had no doubt acquired from birds of that species in my aviary. White, or partially white, varieties of this bird are by no means very uncommon. A pure white one frequented the park at Lilford for many months; I would not allow him to be pursued or molested, but he, or another precisely similar to him, was eventually shot at Barnwell Castle, and sent to me by the slayer with a modest request for 10*s*. The many attractive qualities of this species as a cage-bird are well known; but there is no need for any lover of birds residing in the country to imprison a Starling, as the bird is so common and so familiar that its habits, in a state of freedom, may be closely studied in almost all parts of England. In most parts of Southern Europe the Starling is a winter visitor, and in Andalucia certain reed-fens are hired expressly on account of these birds, which are shot as they come in to roost, pickled, and sent to all parts of the country. To our taste they are extremely nasty as food. There is a theory that pulling their heads off immediately after killing them deprives

them of their natural bitter flavour; but we cannot say that we have found them otherwise than repulsive on the table in any circumstances. Several instances have come to our knowledge in Northamptonshire of pairs of Starlings taking possession of holes in trees prepared as nesting-places by the Green Wood-pecker. It would be natural to suppose that if the matter came to a contest the latter birds would prove the victors; but we are diposed to think that the real reason of the almost invariable victory of the Starling in such cases is that alluded to at p. 232 of the fourth edition of Yarrell's 'British Birds,' viz., the intruders carrying in their nesting materials. In many parts of Southern Europe the place of the Starling as a resident species is occupied by a very closely-allied species, the so-called Sardinian Starling, *Sturnus unicolor*, whose habits are almost identical with those of our common bird.

89. RAVEN. *Corvus corax.*

Although this species was formerly common and well known in our county, we fear that in now treating of it as a Northamptonshire bird we must confine ourselves almost exclusively to the use of the past tense, as the well authenticated notices of its occurrence of late years within our borders which have come to our knowledge are very few and far between. Sir Charles Isham, in a letter dated Lamport Hall, August 28, 1860, writes as follows:—"A pair of Ravens were about here this spring, but I did not see them; my keeper did frequently, also another person who knew them well; he thought that they intended to build in an oak tree in a meadow near the brook. I told this to my old groom who had been here all his life, and died above eighty years old a few months since; he told me that he took the last nest in the parish in that very tree more than sixty years ago; he also took one in Scotland Wood near here when a boy." Mr. A. G. Elliott, of Stamford, informs me that a Raven killed by John Barnwell in Haringworth Wood, May, 1865, "had a deal of rufous-brown on the upper wing-coverts." Another bird of the same species was seen at the same time but not killed. Mr. J. Hensman has informed me that a Raven in the Northampton Museum was shot near Wellingborough in 1868. Mr. G. M. Edmonds, writing in March, 1876, says of this species:—"Single bird twice only seen flying over the Herne (near Perry Mill, below Oundle,) in thirty-six years." Our personal knowledge of the Raven as a wild bird in the neighbourhood of Lilford is confined to the fact that at least forty years ago a pair of this species nested in a high elm tree close to the village of Wigsthorpe, and that certainly none have done so since that period. I have many notices of the former abundance of this bird in various parts of Northamptonshire; but, as in the case of our Kites and Buzzards, the Raven has disappeared

before the advance of civilization and the increase of the preservation of game, and is now to be met with as a resident only in the wilder parts of our islands.

We have had many opportunities of closely observing the habits of this eminently sagacious bird in various parts of the world, and, in spite of his tendencies to murder, assault, and robbery, we must confess to a great liking for him. The Raven is in this country a very early breeder, generally selecting a secure ledge in a cliff, more rarely a tall tree, and returning to the same locality for nesting year after year. The young birds often leave the nest during the first fortnight of March, sometimes before that date. We have more than once heard of a full complement of eggs early in February, and, on the other hand, found unfledged young in more than one Raven's nest as late as the middle of May. The old birds are always wary, one always keeping a close look-out whilst the other is on the nest, and immediately uttering a warning note on the approach of danger. We have heard of Ravens vigorously attacking persons attempting to harm their nests, but have never witnessed anything of the sort, our experience being to the effect that during the siege the parent birds usually soar high in air over the nest, uttering, besides their usual croak of alarm or anger, a curious sound, like the noise made by drawing a tightly fitting cork from a bottle, occasionally turning complete somersaults in the air, and making ferocious stoops in the direction of the invader, but always keeping well out of gunshot-range. For some time after the young Ravens leave the nest they roam in company with their parents, but soon separate and start off singly or in couples on marauding-expeditions on their own account. We often noticed in the highlands of Scotland that the Ravens appeared in force as soon as we begin to kill the deer at the beginning of August; and although in some years none of these birds had nested or been observed before the time just mentioned in the particular locality of which we are treating, henceforward a day rarely passed without our seeing several of these birds during our sojourns at the forest lodge, which generally lasted till the middle of October. The carcases of the deer killed were hardly ever attacked by the Ravens for the first twenty-four hours, even in instances in which we took no precautions to scare them; but if through any mischance we were prevented from bringing in the slain till a second day, we almost invariably found that the eyes and often a considerable portion of the haunches had been devoured.

The Raven is truly omnivorous; no weakly or wounded beast or bird is safe from his attacks. For eggs he has a special liking; fresh or putrid fish, or, in fact, carrion of any sort, will always "fetch" him; and the smaller

mammals and reptiles afford him sport as well as victual. Besides the above dietary, we find that in captivity our dark friends will eat almost every description of insect, besides fruit and vegetables of all sorts, raw or cooked. A Raven taken from a nest in Northern Spain in 1876, and at this time (November, 1881) alive and in fine plumage and condition at Lilford, has, with the exception of the occasional curtailment of some of his wing-feathers, been allowed complete liberty; and his manners are a constant source of amusement and interest to us and a wide circle of acquaintance. Intense curiosity and a curious mixture of boldness and extreme caution are the leading features of the character of "Sankey"—a name which, if we may judge from its frequent repetition by the bird himself, he seems to have accepted with satisfaction. In company with another Raven sent to me from the south of Spain, Sankey spends his summer days in roaming about the lawn in front of the house, where he finds voles, frogs, earth-worms, grasshoppers, and other provend. He almost always accompanies a friend or a stranger to a certain point on the carriage-drive, which he seems to consider the limit of his jurisdiction. He will take any opportunity that presents itself of testing the lower garments or shoe-leather of any unwary male of our species; but we have never heard of his attacking a woman. At any strange dog, large or small, he will "go in," and after bestowing a hearty dig on his hinder parts, retire to some coign of vantage and mock his foe, with an often-repeated "bow-bow," uttered in a complacent and sympathetic tone, which must be peculiarly aggravating to the injured one. The Rooks seem to be on good terms with these Ravens; but we have noticed that Sankey seems to have a great objection to seeing, as often happens, a Jackdaw or Starling perched on the back of a sheep, and will at once dispossess such an individual of his seat and occupy it himself. Any superfluous food is generally hidden away for future consumption, and the hiding places often quaintly chosen, *e. g.* we once saw the Raven carefully part the long feathers on the back of one of our Emus, insert a small fish from his pouch, rearrange the feathers, and hop off with the air of having done a very clever thing. These two Ravens roost regularly all the year round on the same bough of a large elm close to the house, and seem neither to fear or suffer from any stress of weather whatever. In the early spring of 1880 they built two or three nests, but, as far as I could find out, did not lay any eggs. In spite of the wariness and caution of the Raven in a wild state, it is an exceedingly bold bird with regard to others, and will immediately attack any bird of prey which may approach its nest, and, as we have frequently observed in Spain, hold its own, when feeding on a carcase, amongst Vultures of various species, Kites, &c., From a game-preserver's point of view, the Raven, though decidedly a powerful enemy, is not so

pernicious as the Grey Crow, *Corvus cornix;* and though, as we have above stated, the former bird has a decided liking for eggs, he does not, to our knowledge, quarter over a Grouse-moor in search of them, as the latter constantly does. The Highland shepherds hold the Raven in abhorrence from his undeniable habit of attacking their newly born lambs; but we know an old Highland gamekeeper who, after long experience on the moors, maintained that a pair of Ravens were rather beneficial than otherwise to game, on account of their driving away Eagles, Hawks of all kinds, and the aforesaid Grey Crows.

The Raven is found more or less commonly in all parts of Europe and large districts of Asia and N. America.

90.—Carrion Crow. *Corvus corone.*

Although our friend Professor A. Newton treats this bird as not to be distinguished specifically from the Grey Crow, *Corvus cornix*, and although we cannot pretend to sufficient knowledge to pronounce decidedly on such a difficult subject, we at present prefer to treat of the two birds as distinct species, as we feel no doubt they are so considered by those who are acquainted with their habits as observed in Northamptonshire. We, however, strongly recommend all who are interested in the subject to read Professor Newton's remarks thereupon in the fourth edition of Yarrell's 'British Birds,' and to form their own conclusions, merely remarking that on one point, *i.e.*, the absolute similarity of cry, *vide loc. suprà cit.* p. 278, we must entirely disagree with the author. The Black or Carrion-Crow, although unceasingly and vigorously pursued to death by every one who knows its habits, is a common bird in all parts of Northamptonshire with which we are acquainted, and is to be met with generally in pairs at all times of the year; but in wilder and less preserved parts of our country we have often observed flocks of Crows to all outward appearance behaving very much after the manner of Rooks, and coming in night after night to a roosting-place with less outcry, but with much the same preparatory aerial evolutions, as their congeners. About the third week in April the Carrion-Crow builds or returns to its old nest, its partiality for particular nesting sites being very remarkable. We are acquainted with many instances in which a pair of these birds having been shot and their eggs or young and nest destroyed, another pair took possession of the same tree in the following spring, and if the old nest is allowed to remain it is almost always tenanted. We have not a word to say in defence of the Carrion-Crow. His habits appear to us to be purely noxious, and neither his personal appearance, voice, or manners in captivity offer anything in extenuation of his

natural evil propensities. After a flood our meadows are especially affected by this species; and it is curious to observe the way in which they seek for and make use of a large stone upon which to let fall the mussels, whose shells, one would easily imagine, they could easily break by simply fixing and pecking at them. Nothing in the shape of animal food seems to come amiss to the Crow, and their partiality for eggs is only too well known to our gamekeepers and others. We have often seen one of these birds fairly driven away by a pair of Peewits from the vicinity of their nest. As far as we could make out, both birds repeatedly struck the robber with their wings. We also once witnessed a fight between a Carrion-Crow and a pair of partridges, which no doubt had a brood of young in the long meadow grass close at hand; how the battle would have gone we cannot say, for we put an end to it by shooting the crow. We have twice seen a Carrion-Crow catch a Skylark on the wing and carry them off; but these Larks were both in a weak state from protracted frost. The Carrion-Crow is common in many parts of Europe, especially so, according to our own observation, in the valley of the Rhine above Cologne. In Spain it is not very abundant, but we have met with it in all parts of that country.

91. GREY CROW. *Corvus cornix.*

In all respects, except those of plumage and voice, this bird exactly resembles the common Black or Carrion-Crow; but with us in Northamptonshire it is an autumnal migrant, generally putting in an appearance during the first or second week of October, and remaining till the beginning of April. It is never, I think, so abundant in the valley of the Nen as in that of the Welland; but with us its numbers are subject to great variation, and do not seem to depend upon the weather, as I have seen as many during a mild November as in severe frosts. The Grey or Hooded Crow, during its stay with us, roams the country in pairs or small parties, always preferring our large open fields and meadows to more closely enclosed localities. In the eastern counties this species is very abundant during the winter. A great number are shot, and I believe eaten, on their arrival at Hunstanton and other places on the Norfolk coast; and I have often observed, when shooting in the western parts of that county, how these birds will hang about on the flanks or rear of a shooting party, and at once commence operations on any game which, falling at a distance, is not immediately retrieved; but their most flagrant offences against the game-laws are committed in Scotland and the west of Ireland, where they breed abundantly, and lay almost every other species of breeding-bird under contribution. In a certain rocky glen in Invernesshire with which I was well acquainted a pair of Grey Crows had their nest in a Scotch fir, and we found a small

plateau immediately opposite to the said nest literally strewn with eggs sucked by these marauders; besides those of Blackgame, Grouse, Ptarmigan, Wild Duck, Teal, Snipe, Curlew, and Golden Plover, which they might find in some abundance at a comparatively short distance, we discovered fragments of the eggs of Song-Thrush, Wood-Pigeon, Landrail, Waterhen, and Grey Partridge, none of which birds bred within several miles of the nest to which we refer. The gamekeepers annually destroyed this nest and the crows, but a fresh pair of these birds regularly built in the identical fork of the fir above mentioned during the nine years of our tenancy of the shooting of the district. It is a curious fact that although the present species is a winter visitor to England from the north of Europe, in almost all parts of which it is abundant in the summer, it is nevertheless the common Crow of Sardinia, Cyprus, Palestine, and Egypt. In the two former of these countries we found it breeding in numbers in low trees, the nests and eggs very closely resembling those of the Black Crow. The Grey Crow varies greatly in dimensions and shade of colour, those which we have examined from the south and east end of Europe being smaller and lighter-coloured than our own birds; but large or small, dark or light coloured, the habits of the bird are always abominable; and although, from the accident of its not nesting in our county, we are not exposed to the detriment from this thief to which those dwelling on the other side of the Tweed are subject, we have no plea to urge in defence of the Grey Crow, and hold him as a sturdy vagrant to be summarily dealt with at all times and in all places. We should be sorry to *exterminate* any bird; but this one could be better spared than any other with which we are acquainted.

*(To be continued.)*

# A SYSTEMATIC CLASSIFICATION OF THE LEPIDOPTERA WHICH HAVE OCCURRED IN THE VICINITY OF NORTHAMPTON.

By Wm. Hull and H. F. Tomalin.

## Family V.—Orthsidæ.

### Genus I.—Charæas (Steph.)

*Species* 1...*C. Graminis*[a] (Linn.) ...*Antler*

### Genus II.—Tæniocampa (Led.)

,, 1...*T. Gothica* (Linn.) ...*Hebrew Character*

,, 2... ,, *Populeti* (Fabr.) ...*Lead-coloured Drab*

Locality—Whittlebury Forest.

,, 3... ,, *Stabilis* (Wien Verz.) ...*Common Quaker*

,, 4... ,, *Instabilis* (Triet.) ...*Clouded Drab*

### Genus III.—Pachnobia (Led.)

,, 1...*P. Rubricosa* (Wien Verz.) ...*Red Chestnut*

### Genus IV.—Orthosia (Treit.)

,, 1...*O. Pistacina* (Fabr.) ...*Pale-headed Chestnut*

*Serina (var.)* (Esp.) ...*Pale-headed Chestnut*

Locality—Northampton, Hardwick.

,, 2... ,, *Rufina* (Linn.) ...*Flounced Rustic*

Locality—Northampton, Salcey Forest.

,, 3... ,, *Satellitia* (Linn.) ...*Satellite*

,, 4... ,, *Ferruginea* (Triet.) ...*Brick*

Locality—Northampton, Wellingborough, Whittlebury Forest.

,, 5... ,, *Lota* (Linn.) ...*Red Line Quaker*

Locality—Whittlebury Forest.

,, 6... ,, *Macilenta* (Hübn.) ...*Yellow Line Quaker*

Locality—Salcey Forest.

,, 7... ,, *Litura* (Linn.) ...*Brown-spot Pinion*

### Genus V.—Cirhœdia (Guén.)

,, 1...*C. Xerampelina* (Wien Verz.) ...*Centre-barred Sallow*

Locality—Northampton, Wellingborough.

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[a] The larvæ of this Moth never emerges from the soil. It feeds on the roots of grasses. On the Continent its approach is looked upon with terror, in some places completely destroying the grass crops.

GENUS VI.—COSMIA (Ochs.)

*Species* 1...*C. Trapezina* (Linn.) ...*Dun Bar*

,, 2... ,, *Affinis* ,, ...*Lesser-spotted Pinion*

,, 3... ,, *Diffinis* ,, ...*White* ,, ,,

Locality—Northampton, Whittlebury Forest.

,, 4... ,, *Pyralina* (Wien Verz.) ...*Lunar-spotted Pinion*

GENUS VII.—HYDRŒCIA (Guén.)

,, 1...*H. Nictitans* (Linn.) ...*Golden Ear*

Locality—Wellingborough.

,, 2... ,, *Micacea* (Esp.) ...*Rosy Rustic*

Locality—Northampton.

GENUS VIII.—GORTYNA (Led.)

,, 1...*G. Flavago* (Wien Verz.) ...*Frosted Orange*

Locality—Northampton, Wellingborough, etc.

FAMILY VI.—CERASTIDÆ.

GENUS I.—XANTHIA (Treit.)

,, 1...*X. Silago* (Treit.) ...*Pink-barred Sallow*

,, 2... ,, *Cerago* ,, ...*Sallow*

,, 3... ,, *Aurago* (Wien Verz.) ...*Barred Sallow*

Locality—Whittlebury Forest.

,, 4... ,, *Citrago* (Linn.) ...*Orange Sallow*

GENUS II.—ORRHODIA (Hübn.)

,, 1...*O. Erythrocephala* (Wien Verz.) ... *Red-headed Chestnut*

FAMILY VII.—AMPHIPYRIDÆ.

GENUS I.—SCOLIOPTERYX (Germ.)

,, 1...*S. Libatrix* (Linn.) ...*Herald*

GENUS II.—AMPHIPYRA (Ochs.)

,, 1...*A. Tragopogonis* (Linn.) .. *Mouse*

,, 2... ,, *Pyramidea* ,, ...*Copper Underwing*

Locality—Courteenhall Park, Wellingborough.

FAMILY VIII.—AGROTIDÆ.[b]

GENUS I.—TRIPHÆNA (Hübn.)

,, 1...*T. Ianthina* (Wien Verz.) *Lesser broad-bordered Yellow Underwing*

Locality—Northampton, Billing Magna, Whittlebury Forest.

,, 2... ,, *Interjecta* (Hübn.) *Least broad-bordered Yellow Underwing*

,, 3... ,, *Orbona* (Fabr.) *Lesser* ,, ,, ,,

,, 4... ,, *Pronuba* (Linn.) *The* ,, ,, ,,

*Innuba* (*var.*) (Ochs.)

b The larvæ of the Agrotidæ, in common with many species of the Noctuæ, are mostly night-feeders, the larvæ remaining underground during the daytime.

GENUS II.—AGROTIS (Hübn.)

SECTION "A."—GRAPHIPHORA (Ochs.)

*Species* 1...*G. Augur* (Fabr.) ...*Dart*

,, 2... ,, *Xanthographa* (Wien Verz.) ...*Square-spot Rustic*

,, 3... ,, *Umbrosa* (Hübn.) ...*Six-striped* ,,
Locality—Northampton.

,, 4... ,, *Triangulum* ,, ...*Double Square-spot*
Locality—Northampton.

,, 5... ,, *C—Nigrum* (Linn.) ...*Setaceous Hebrew Character*

,, 6... ,, *Plecta* ,, ...*Flame Shoulder*

,, 7... ,, *Putris* ,, ...*Flame*

SECTION "B."—AGROTIS (Hübn.)

,, 1...*A. Candelisequa* (Hübn.) ...*Brown Clay*
Locality—Northampton.

,, 2... ,, *Obelisca* (WienVerz.) ...*Square-spot Dart*
Locality—Northampton.

,, 3... ,, *Fuliginea* (Hübn.) ...*Garden Dart*

,, 4... ,, *Segetum* (WienVerz.) [c] ...*Common* ,,

,, 5... ,, *Exclamationis* (Linn.) ...*Heart and Dart*

,, 6... ,, *Suffusa* (Hübn.) ...*Dark Sword Grass*
Locality—Northampton, Wellingborough, Whittlebury Forest.

FAMILY IX.—HADENIDÆ.

GENUS I.—APLECTA (Boisd.)

,, 1...*A. Occulta* (Linn.) ...*Great Brocade*

,, 2... ,, *Herbida* (WienVerz.) ...*Green Arches*
Locality—Salcey Forest, Wellingborough.

GENUS II.—APAMEA (Treit.)

,, 1...*A. Testacea* (WienVerz.) ...*Lesser Flounced Rustic*

GENUS III.—NEURONIA (Hübn.)

,, 1...*N. Popularis* (Fabr.) ...*Feathered Gothic*
Locality—Northampton, Wellingborough, Whittlebury Forest.

GENUS IV.—HELIOPHOBUS [d] (Boisd.)

,, 1...*H. Hispidus* (Geyr.) ...*Beautiful Gothic*
Locality—Whittlebury Forest.

[c] In some districts the larvæ of this Moth causes immense damage to root crops, for example turnips, carrots, mangold-wursel, etc., eating deeply into the bulbs of the plants, which, from outward appearance, are perfectly sound. Fortunately the moth is not plentiful in this district.

[d] Heliophobus. Sun-fearing. Gk. helios—sun, phobos—fear. The larva live mostly underground.

GENUS V.—APROPHYLLA (Led.)

*Species* 1...*A. Australis* (Boisd.) ...*Feathered Brindle*
Locality..Whittlebury Forest.

GENUS VI.—CERIGO (Boisd.)

,, 1...*C. Cytherea* (Fabr.) ...*Straw Underwing*
Locality..Whittlebury Forest.

GENUS VII.—MISELIA (Steph.)

1...*M. Oxyacanthæ* (Linn.) ...*Green Brindled Crescent*
Locality..Northampton.

GENUS VIII.—DICHONIA (Hübn.)

1...*D. Aprilina* (Linn.) ...*Marvel-du-Jour*
Locality..Hardingstone, Whittlebury Forest, Long Buckby, Yardley Chase, Brampton, Wellingborough.

GENUS IX.—DRYOBOTA (Led.)

, 1...*D. Proteus* (Wien Verz.) ...*Brindled Green*
Locality..Northampton, Hardwick.

GENUS X.—POLIA (Triet.)

,, 1...*P. Flavocincta* (Wien Verz.) ...*Large Ranunculus*

,, 2... ,, *Chi* (Linn.) ...*Chi Moth*
Locality..Northampton.

GENUS XI.—DIANTHŒCIA (Boisd.)

,, 1...*D. Capsincola* (Wien Verz.) ...*Lychnis*

,, 2... ,, *Cucubali* ,, ...*Campion*
Locality..Northampton.

GENUS XII.—MAMESTRA (Ochs.)

1...*M. Saponariæ* (Bork.) ...*Bordered Gothic*
Locality..Wellingborough.

,, 2... ,, *Serena* (Wien Verz.) ...*Broad-barred White*
Locality..Northampton, Wellingborough.

,, 3... ,, *Dysodea* ,, ...*Ranunculus*
Locality..Wellingborough.

,, 4... ,, *Oleracea* [e] (Linn.) ...*Bright-line Brown-eye*

,, 5... ,, *Pisi* ,, ...*Broom Moth*

,, 6... ,, *Persicariæ* ,, ...*Dot* ,,

,, 7... ,, *Brassicæ* [f] ,, ...*Cabbage* ,,

[e] The larva of this Moth feeds upon garden plants, especially broccoli, hence the popular name Pot-herb Moth.

[f] The larva of this Moth feeds upon garden plants, especially upon the cabbage, and this caterpillar, from its habit of hiding in the daytime towards the centre of the plant, sometimes unwelcomely appears at the dining table.

*Species* 8...*M* *Chenopodii* (Wien Verz.) ...*Nutmeg*
„ 9... „ *Nebulosa* (Hüfn.) ...*Grey Arches*
„ 10... „ *Advena* (Wien Verz.) ...*Pale Shining Brown*
„ 11... „ *Leucophæa* „ ...*Feathered Ear*
Locality..Whittlebury Forest.
„ 12... „ *Thalassina* (Hüfn.) ...*Pale-shouldered Brocade*
Locality..Whittlebury Forest.

GENUS XIII.—HADENA (Treit,)

„ 1...*H.* *Adusta* (Esp.) ...*Dark Brocade*
Locality..Northampton, Wellingborough.
„ 2... „ *Abjecta* (Hübn.) ...*Crescent Striped*
Locality..Northampton.
„ 3... „ *Polyodon* (Linn.) ...*Dark Arches*
„ 4... „ *Lithoxylea* (Wien Verz.) ...*Light* „
„ 5... „ *Subleustris* (Esp.) ...*Reddish* „
Locality..Northampton.
„ 6... „ *Anceps* (Hübn.) ...*Large Nutmeg*
„ 7... „ *Unanimis* „ ...*Uniform Rustic*
„ 8... „ *Basilinea* (Wien Verz.) ...*Rustic-shoulder Knot*
„ 9... „ *Rurea* (Fabr.) ...*Clouded-bordered Brindle*
„ 10... „ *Scolopacina* (Esp.) ...*Slender* „ „
Locality..Whittlebury Forest.

# METEOROLOGICAL REPORT FOR OCTOBER, NOVEMBER, AND DECEMBER.

THE month of October was somewhat remarkable both for the large total fall of rain and the number of days on which it fell, only three days being recorded without rain. In Northampton the total amount of 5·03 ins. was registered, being more than double the average for the last 13 years. On the 24th a cyclonic storm of considerable violence swept across the country, the centre of the depression passing within a few miles to the S.E. of this town about mid-day. Rain fell heavily up to 12 noon, when there was a cessation until one o'clock, then another heavy fall began with strong wind and snow for an hour or so; many trees were blown down in the neighbourhood during the storm.

The rainfall in Northampton, from six a.m. to six p.m, was 1·36 ins., while at other places much more fell, as at Fawsley, 1·89 ins., Holdenby, 1·79 ins., and Weedon, from six a.m. to six p.m., 1·56 ins. This heavy downpour following on the previous rains caused very extensive floods along the Nene valley. In St. James' End, Northampton, the houses were flooded to a considerable depth.

A fine display of Aurora was seen here, as at other parts of the country, on the evening of the 2nd.

The great Comet—by far the largest and most brilliant seen in this country since 1858—has been visible for a few hours before daybreak during the month.

The long spell of wet weather which prevailed during October continued until the 9th of November, when there were a few fine days; on the night of the 15th there was a heavy fall of snow, with a strong N.E. wind, when 0·40 in. of melted snow was registered. The remainder of the month was very unsettled; a sharp frost occured on the night of the 18th, when 8 degrees of frost were registered. There was a fine display of Aurora on the 17th—the most brilliant seen here for many years past, lasting from five p.m. until early morning. About six p.m., a luminous cone-shaped body, some 20 degrees long and 3 degrees broad, of a bluish white color was seen to pass from E. to W. On the same day an underground electrical disturbance prevailed over this country, the Continent, and America, interrupting telegraphic communications for some hours.

The Revd. H. Waller writes from Twywell, "seldom ever has the sowing season for wheat been so disastrous; on the heavy lands all sorts of devices have been resorted to, and the old method of broad casting has taken the place of the drill, whilst thousands of acres which would have been seeded in October are in a state impossible to touch.

Floods have prevailed extensively all over the country.

In North Northamptonshire there has been no great influx of northern birds; the Woodcock is rare this year, and only a few Fieldfares have been heard; Blackbirds and Thrushes began to sing on the 21st."

The month of December was generally wet and warm, the mean temperature being much above the average. A heavy snowstorm occurred on the 7th, fog prevailed from the 13th to the 20th, and a sharp frost on the 12th, the Thermometer registering 18 degrees or 14 degrees of frost.

Farming operations have been almost at a standstill during the month, in consequence of the heavy rains, which have registered 0·40 ins. above the average for the last 13 years.

F. LAW.

# METEOROLOGICAL OBSERVATIONS, 1882.

## OCTOBER, 1882.

| STATION. | OBSERVER. | RAINFALL. | | | | | SHADE TEMPERATURE. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total for Month. | Total for Year. | Greatest Fall. | | Wet Days. | Maximum. | | Minimum. | |
| | | | | In. | Date. | | Deg. | Date. | Deg. | Date. |
| Northampton .. | H. Terry ..... | 5·18 | 25·46 | ·86 | 24 | 27 | 55 | 6 | 35 | 25 |
| " .. | S. Law..... | 5·09 | 24·80 | ·84 | 24 | 28 | 65 | 1 | 27 | 26 |
| Castle Ashby .. | R. G. Scriven..... | 5·36 | 26·96 | 86 | 24 | 26 | 67 | 1 | 32 | 25 |
| Weedon ..... | R. Capell ..... | 6·04 | 27·80 | 1·10 | 24 | 18 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 3·80 | 26·46 | 1·35 | 24 | 28 | 67 | 1 | 27 | 26 |
| Rothwell ..... | J. More, M.D..... | 4·15 | .. | 1·00 | 24 | 25 | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Towcester..... | J. Webb ..... | 6·18 | 28·37 | 1·20 | 24 | 25 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 5·12 | 26·45 | ·87 | 24 | 26 | 60 | 1 | 28 | 26 |
| Fawsley ..... | Lady Knightley.... | 5·98 | 26·70 | 1·39 | 24 | 26 | 63 | 1 | 30 | 25 |
| Thorpe Man'ville | Seth Barnes ..... | 5·95 | 29·67 | 1·05 | 24 | 25 | .. | .. | .. | .. |
| Holdenby ..... | J. Gregory ..... | 6·43 | .. | 1·42 | 24 | 27 | .. | .. | 25 | 26 |
| Twywell Rectory | Rev. H. Waller .... | 4·29 | 25·04 | ·79 | 25 | 23 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller..... | 5·82 | 29·66 | ·84 | 24 | 27 | 65 | 1 | 25 | 25 |
| Haselbeach .... | E. T. Morgan..... | 4·22 | .. | 1·59 | 24 | 25 | .. | .. | .. | .. |
| Average 16 years 1866-81 ..... | H. Terry ..... | 2·44 | 21·78 | .. | .. | .. | .. | .. | .. | .. |
| **NOVEMBER.** | | | | | | | | | | |
| Northampton .. | H. Terry ..... | 3·40 | 28·86 | ·98 | 6 | 23 | 57 | 5 | 24 | 17 |
| " .. | S. Law..... | 3·17 | 27·92 | 1·03 | 6 | 21 | 58 | 5 | 21 | 11 |
| Castle Ashby .. | R. G. Scriven..... | 4·00 | 30·96 | ·96 | 6 | 20 | 60 | 5 | 25 | 17 |
| Weedon ..... | R. Capell ..... | 4·46 | 32·26 | 1·09 | 6 | 16 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 3·66 | 30·12 | 1·07 | 6 | 18 | 60 | 5 | 23 | 18 |
| Rothwell ..... | J. More, M.D. .... | 3·04 | .. | ·97 | 6 | 26 | .. | .. | .. | .. |
| Oundle ..... | J. S. Clarke..... | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Towcester .... | J. Webb ..... | 4·13 | 32·40 | ·96 | 6 | 21 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 3·43 | 29·88 | ·97 | 6 | 23 | 49 | 5 | 22 | 18 |
| Fawsley ..... | Lady Knightley .. | 4·73 | 31·43 | 1·22 | 15 | 23 | 57 | 5 | 20 | 18 |
| Thorpe Man'ville | Seth Barnes ..... | 4·52 | 34·19 | ·91 | 15 | 21 | .. | .. | .. | .. |
| Holdenby ..... | J. Gregory ..... | 4·14 | .. | 1·05 | 6 | 21 | .. | .. | 20 | 18 |
| Twywell Rectory | Rev. H. Waller .... | 3·85 | 28·39 | ·98 | 7 | 23 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller ..... | 4·45 | 34·11 | ·93 | 15 | 22 | 57 | 5 | 14 | 17 |
| Haselbeach .... | E. T. Morgan..... | 3·70 | .. | 1·06 | 6 | 21 | .. | .. | .. | .. |
| Average 16 years 1866-81 ..... | H. Terry ..... | 2·33 | 23·85 | .. | .. | .. | .. | .. | .. | .. |
| **DECEMBER.** | | | | | | | | | | |
| Northampton .. | H. Terry ..... | 2·74 | 31·60 | ·55 | 7 | 19 | .. | .. | ... | .. |
| " .. | S. Law ..... | 2·50 | 30·47 | .59 | 7 | 19 | 53 | 28 | 18 | 12 |
| Castle Ashby .. | R. G. Scriven ..... | 2·76 | 33·72 | ·68 | 9 | 17 | 56 | 28 | 20 | 11 |
| Weedon ..... | R. Capell..... | 3·04 | 35·30 | ·42 | 25 | 17 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 2·90 | 33·02 | ·57 | 7 | 19 | 56 | 28, 29 | 15 | 12 |
| Towcester ..... | J. Webb ..... | 2·79 | 35·29 | ·38 | 25 | 19 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 2·68 | 32·56 | ·52 | 7 | 19 | 49 | 28 | 24 | 2 |
| Fawsley ..... | Lady Knightley .. | 3·29 | 34·72 | ·91 | 7 | 22 | 52 | 28 | 15 | 11 |
| Thorpe Man'ville | Seth Barnes ..... | 3·37 | 37·56 | ·55 | 7 | 21 | .. | .. | .. | .. |
| Holdenby House. | J. Gregory ..... | 3·33 | .. | ·67 | 25 | ... | .. | ... | 11 | 12 |
| Twywell Rectory | Rev. H. Waller .... | 3·18 | 31·57 | ·87 | 8 | 18 | 55 | 28 | .. | .. |
| Whittlebury .... | W. S. Miller .... | 3·22 | 37·33 | ·49 | 25 | 19 | 53 | 29 | .. | .. |
| Haselbeach .... | E. T. Morgan..... | 2·66 | 31·99 | ·61 | 25 | 20 | .. | .. | .. | .. |
| Average 16 years 1866-81 ..... | H. Terry ..... | 2·31 | 25·94 | .. | .. | .. | .. | .. | .. | ... |

HENRY TERRY, SURGEON.

## PLANTS SEEN IN FLOWER, NOVEMBER (LAST HALF), 1882.

| | |
|---|---|
| Ranunculus repens ... ... ... | Crowfoot |
| ,, acris... ... ... ... | ,, |
| Stellaria media ... . . ... ... | Common Chickweed |
| Capsella bursa-pastoris ... ... ... | Shepherd's Purse |
| Lychnis diurna ... ... ... ... | Red Campion |
| Geum urbanum ... ... ... ... | Herb Bennet |
| Heracleum spondyleum... ... ... | Hog's Weed |
| Hedera helix ... ... ... ... | Ivy |
| Lapsana communis ... ... .. | Nipple-Wort |
| Senecio vulgaris ... ... ... ... | Groundsell |
| Bellis perennis ... ... ... ... | Daisy |
| Leontodon taraxacum ... ... ... | Dandelion |
| Pyrethrum inodorum ... ... ... | Feverfew |
| Centaurea nigra ... ... ... ... | Knap Weed |
| Achillea millefolium ... ... ... | Yarrow |
| Lamium alba ... ... ... ... | White Dead Nettle |
| ,, purpureum ... ... ... | Red ,, |
| Euphorbia Exigua ... ... ... | Spurge |

## PLANTS SEEN IN FLOWER, DECEMBER, 1882.

| | |
|---|---|
| Ranunculus repens ... ... ... | Crowfoot (17th) |
| ,, acris... ... ... ... | ,, (3rd) |
| Sisymbrium officinale .. ... ... | Hedge Mustard (3rd) |
| Stellaria media ... ... ... ... | Common Chickweed (3rd) |
| Ulex Europeus ... ... ... ... | Gorse (26th) |
| Geum urbanum ... ... ... ... | Herb Bennet (24th) |
| Hedera Helix ... ... ... ... | Ivy (17th) |
| Lapsana communis ... ... ... | Nipple-Wort (10th) |
| Senecio vulgaris ... ... ... ... | Groundsell |
| Bellis perennis ... ... ... ... | Daisy |
| Leontodon taraxacum ... ... ... | Dandelion (17th) |
| Chrysanthemum inodorum ... ... | Feverfew (17th) |
| Achillea millefolium ... ... ... | Yarrow (17th) |
| Lamium album .. ... ... ... | White Dead Nettle (24th) |
| ,, purpureum ... ... ... | Red ,, (24th) |
| Euphorbia exigua ... ... ... | Spurge |

Northampton. WILBY LAW.

# THE LIFE HISTORY OF THE LIVER-FLUKE.

*The Rot in Sheep. By James Beart Simonds, Principal of the Royal Veterinary College, &c.*

*Report of Experiments on the Development of the Liver-fluke (Fasciola Hepatica). By A. P. Thomas, B.A., Demonstrator of Anatomy, University Museum, Oxford.*

*Second Report of Experiments on the Development of the Liver-fluke (Fasciola Hepatica). By A. P. Thomas, M.A., F.L.S., Balliol College, Oxford.*

THE disease generally called "Rot" in sheep, sometimes also called "Bane," or "Coatle," has long been known as a scourge to domestic animals, sheep being the principal sufferers, though cattle and horses are sometimes affected. It is only, however, very recently that its exact cause has been discovered; and experiments are still being carried on with a view of clearing up the few difficulties which remain. The earliest writers on the subject considered the disease to have been caused by feeding on particular plants. Thus Leonard Mascall, "chief farrier to King James," in his work *The Government of Sheepe, 1587*, mentions the "grasse or weed called speare wort," and the "weed called Peniwort or Penie grasse," as the things which "do hurt or rotte sheepe." Gervase Markham, in his *Cheape and good Husbandry, 1614*, repeats Mascall's remarks, and adds, that "knot grasse is not good, or mildew'd grasse;" and also that "there bee little white snailes which a sheep will licke up, and they will soon rot him."

Ellis, in the *Shepherd's sure Guide, 1749*, was perhaps the first to notice the abundance of flukes, or "plaiseworms" as he calls them, in the liver of sheep affected, but he attributes their presence to spontaneous generation, saying that they are bred by the consumption of the blood from the use of unwholesome food. Early in the present century it seems to have been known that the fluke produced multitudes of eggs, and an impression began to gain ground that the disease might be caused by the sheep picking up these eggs on the herbage after damp weather. These various opinions continued to prevail until 1860, when a great outbreak of the disease took place, and a lecture was delivered by Professor J. B. Simonds, before the Royal Agricultural Society, on this subject. This lecture was published

both in the pages of the Society's Journal, and in pamphlet form, and the pamphlet was republished by request of the Council in 1880, after the severe outbreak of the disease in 1879, with the author's emendations and additions. In this pamphlet Professor Simonds, after detailing the various opinions which had prevailed, shews conclusively that the disease is caused by the presence of flukes in the liver, and by no other cause. He rejects, however, the theory that the disease is propagated by the sheep eating the ova of the fluke which are distributed over the grass in the droppings of diseased animals, having found, by experiments, as early as 1852, that a large quantity of these ova might be administered to a healthy sheep without any unfavourable result. He concludes, therefore, that the young of the fluke must probably go through an intermediate stage of existence, and probably, judging from analogy, as the parasite of some species of mollusc; they would then become encysted, a state of existence similar to the chrysalis of the Lepidoptera, and in this stage would be swallowed by the sheep, in whose body they would assume their mature form. It became, therefore, important to ascertain which molluscs served the purpose of intermediates, and for this purpose some valuable experiments have recently been carried out by Mr. A. P. Thomas, the results of which have been published in the journal of the Royal Agricultural Society.

Mr. Thomas begins by describing the eggs of the fluke, which are found in immense numbers in the contents of the bile ducts and gall bladder of the infected animal, giving the secretions a dark brown colour. They pass with the bile into the intestines, and may be found abundantly in the droppings of rotten sheep. (Fig. 2.)

"The number of eggs produced by a single fluke is exceedingly large, and its fecundity has been underrated. Leuckart has estimated that the oviduct can contain as many as 45,000 eggs. In one case I obtained 7,400,000 eggs from the gall bladder of a sheep suffering from the rot, and as the liver contained about 200 flukes, this gives an average of 37,000 eggs to each fluke. And these eggs were found in the gall bladder alone; the liver must have contained at least as many more, and eggs had been passed copiously by the sheep for some months past. The number of eggs produced by a single fluke may be safely estimated at several hundred thousands."

Mr. Thomas has succeeded in hatching these eggs, which he says require moisture and a moderate temperature, about 23° C. to 26° C. being most favourable, or from 74 to 78 degrees Fahrenheit. At this temperature they will hatch in two or three weeks, while at a lower temperature two or three months may be required. In winter no progress is made. On emerging from the shell the embryo swims freely through the water, propelled by the movement of the cilia, with which its whole body is covered. Mr. Thomas describes it as being exceedingly active, swimming restlessly to and fro, and

stopping to examine the nature of any substance with which it comes into contact. The average duration of its life is about eight hours. (Fig. 3.)

Great difficulty was experienced at this stage of the enquiry. Mr. Thomas exposed a number of snails of various species, *Arion ater*, *Arion hortensis*, *Limax agrestis*, and *Limax cinereus*, to infection, by placing them in contact with large numbers of the ova and embryos of the fluke. He also experimented upon some of the aquatic mollusca, *Planorbis marginatus*, *Succinea amphibia*, *Limnæus pereger*, and *L. truncatus*, confined with the embryos in a small vessel, but in neither case did the snails, when subsequently dissected, contain any parasites which could be identified as the young of the Liver-fluke. In the second series of experiments carried out during the summer of 1882, and described in the last issue of the journal of the Royal Agricultural Society, a successful result was obtained. Mr. Thomas exposed a number of specimens of the *Limnæus truncatus* to infection in a large tank prepared for the purpose.

"The snails were speedily found to have afforded a suitable place for the further development of the embryos, and of those examined up to the present time all have been proved to be infected, often containing as many as eighty embryos. Indeed the infection was too successful, for about the tenth day many of the snails began to sink and die, simply because they were exhausted by the excessive number of parasites, so that by the end of the fourth week I had only two left alive out of the eighty that had been infected."

Some of these snails were dissected from time to time, and the development of the embryo carefully noted. The first change was the loss of the cilia, and the embryo assumed an elliptical form. (Fig. 4.) Within this body, which now became a sporocyst, germs began shortly to develop, which were destined to form a second generation, each of which as soon as it became full grown broke through the walls of the sporocyst and entered upon an independent existence as a free redia, still within the body of the mollusc. (Fig. 5.)

The wound produced by its forcible exit closed up at once, and the germs still remaining continued to develop. This occurred about the 13th day. In a snail dissected on the 23rd day the free rediæ had increased in size, and began to shew signs of forming germs of the third generation. (Fig. 6.) On the 31st day these germs were making progress, the larger rediæ containing nearly a score of them in various stages, the larger of which were of an irregular oval shape, with a smooth surface, and enclosed each in a loose and delicate pellicle. But there was still no evidence as to the form these spores would assume. Lastly, in a snail dissected at the beginning of the seventh week after infection, Mr. Thomas found rediæ containing cercariæ, which, though not quite mature, were sufficiently so for their character to be determined. This completes the cycle, and the only remain-

ing point to be ascertained is how the cercariæ are transferred to the sheep. This may be either from the sheep eating the mollusc, which would be easy enough from the fragile nature of its structure, or the cercariæ may pass out of the snail and encyst upon the grass. We will conclude with Mr. Thomas's appeal for assistance, which we hope may be largely responded to by members of the Northants Naturalists' Society.

"It would greatly assist me in bringing my researches to a speedy and successful termination if any gentleman who is interested in the question could kindly forward to me, at the University Museum, Oxford, gatherings of snails, more especially of *Limnæus peregor*, and *L. trunculatus*, from the scene of any well marked outbreak of Fluke-disease, or from ground which is known always to give the rot. The snails should be as numerous as possible, and should particularly include young and half-grown examples. The accompanying figures represent the two kinds of snails, towards which, in the present state of the investigation, the evidence points most strongly as the bearers of the larval form of the Liver-fluke."

We have to thank Mr. Newman for the accompanying drawings, taken from the Journal of the Royal Agricultural Society. They are as follows :

Fig. 1. Adult specimens of the Liver-fluke (Fasciola hepatica.)

Fig. 2. Egg of the Liver-fluke examined shortly after leaving the sheep. At one end of the shell may be seen the line marking off the lid, and a little below the embryo, in a very early state of development, and surrounded by the secondary yolk spheres, only three of which have been filled up. Magnified 340 diameters.

Fig. 3. Embryo of Liver-fluke boring into a snail. Magnified 370 diameters.

Fig. 4. Embryo of Liver-fluke soon after it has settled in the snail. Magnified 370 diameters.

Fig. 5. Adult sporocyst of Liver-fluke, containing several germs in different stages of development. The largest has assumed the character of a redia. Magnified 230 diameters.

Fig. 6. A free redia (second generation) of the Liver-fluke, with the contents forming into germs of the third generation. Magnified 230 diameters.

Fig. 7. *Limnæus peregor*. An average specimen. Natural size.

Fig. 8. *Limnæus trunculatus*. Twice natural size.

Fig. 9. The same. A common variety. Natural size.

Professor Simonds' pamphlet, and the Journals of the Royal Agricultural Society containing Mr. Thomas's papers, will be placed in the library for the present, for the use of members of the Society who may like to have access to fuller information on the subject than our space would permit.

R.G.S.

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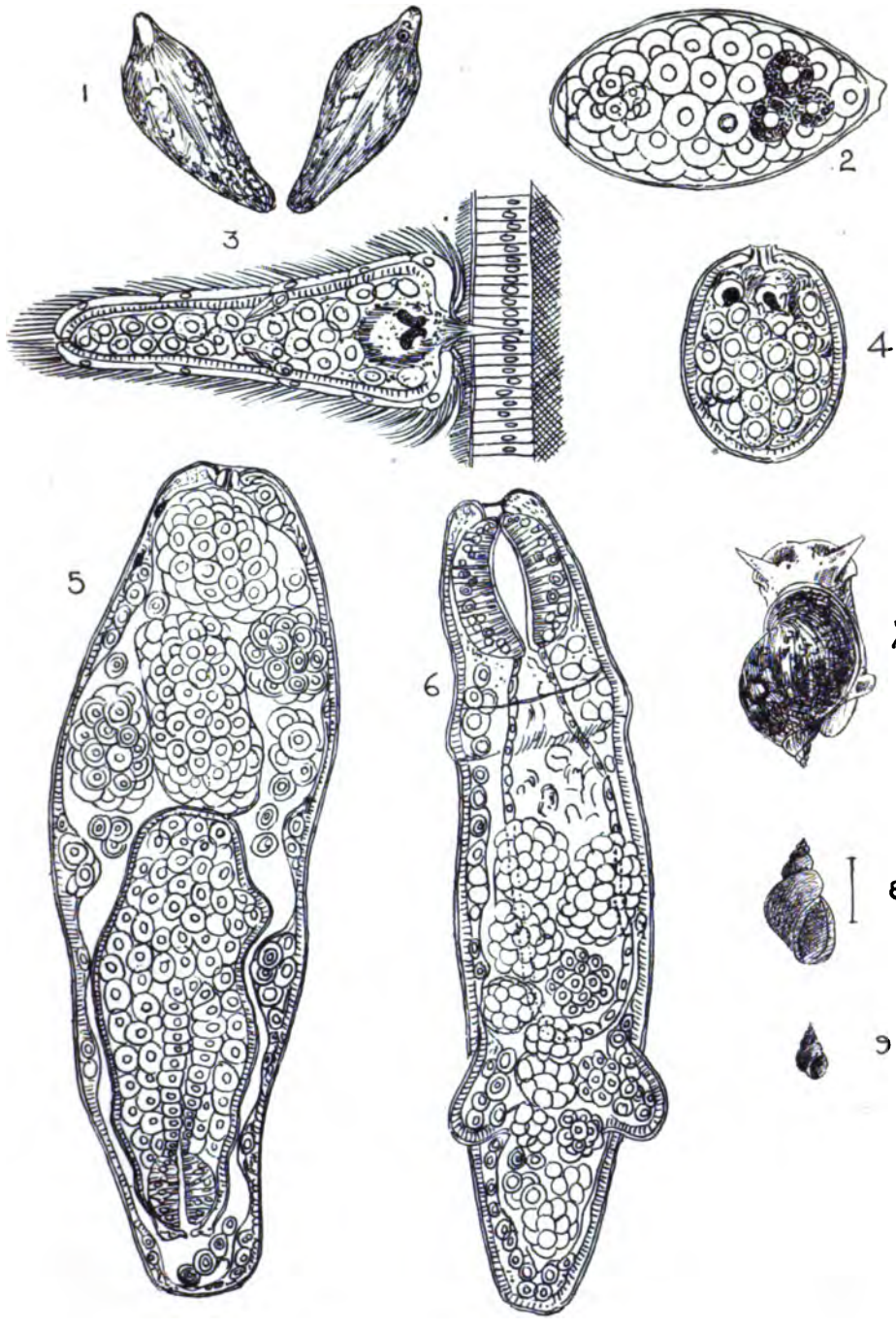
## NOTES ON THE TWO SPECIES OF SNAIL INFECTED BY THE LIVER-FLUKE (LIMNÆUS PEREGER AND L. TRUNCULATUS.)

THE genus Limnæus belongs to the order of Pulmonobranchiata Gasteropoda, that is to say they, are provided with lung-like gills, and respire, for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the most part, atmospheric air, so that although many species are exclusively aquatic, they are compelled to rise occasionally to the surface to renew the supply of air.

Limnæus pereger (Fig. 7) is a pretty animal. In a typical specimen the colour of the body is an olive green, mottled with black, and covered with small yellow and black specks; the tentacles are triangular and diverge from each other at nearly right angles, the eyes being between them; the shell itself is yellowish horn-colour, but being semitransparent the colour of the body is seen through giving it a mottled appearance; in size it is about three-quarters-of-an-inch long and nearly half-an-inch broad. There are a great number of varieties which vary from the type in almost every particular, many of them having been raised to distinct species by the older authors.

Dr. J. G. Jefferys says of it "The variability of this common and abundant species is equal to the extent of its geographical distribution," and it is to be found in still and slowly running waters everywhere. There is scarcely a river, pond, or ditch anywhere in which it is not to be found. As its name signifies it is a traveller, and being nearly amphibious can often be found away from water in damp places. It is very prolific, laying more than 1,000 eggs in a season.

Limnæus truncatulatus (Figs. 8 and 9) is much smaller than L. pereger, being only two-fifths-of-an-inch long and one-fifth-of-an-inch broad. Its body is of a dark brown or grey colour, the tentacles being short and slender and rounded at their tips. The shell is much longer in proportion than L. pereger, and tapers to a fine point. There are a good number of varieties, and it is to be found everywhere in the neighbourhood of water, especially on the mud of river banks, and in the little pools left after floods in the meadows, and, being nearly amphibious, is often found where there is but little water. Its minute size and turriculated spire will serve to distinguish it.

W.D.C.

# NOTES ON LOCAL GEOLOGY.

*Part IX.*

## The "Spinatus" Zone of the Middle Lias.

The "*spinatus*" zone is the one which immediately succeeds the "*margaritatus*" zone; and in Northamptonshire it appears to consist of four well marked beds, two of them hard and two soft. I can say very little about the soft beds because I have never yet seen either of them well exposed, but the hard beds can be examined in a few places, indeed the upper one—the *rock-bed*—can be in very many.

A good number of sections have already been given in which some part of the "*spinatus*" zone was represented. The best, however, is the one described in part vii. of these notes as occurring at Byfield; in this all the four beds are present.

All the four beds of the "*spinatus*" zone appear to be present in the neighbourhood of Northampton, although several of the "*margaritatus*" ones are certainly absent. This, I think, will be evident from a perusal of the following sections, for both of which I am indebted to Mr. H. Eunson. The notes in italics are my own:—

Section at the Kettering Road Well and Bore Hole.

| | | ft. | in. | |
|---|---|---|---|---|
| *Upper Lias.* | Surface clay and marl ... ... | 4 | 0 | |
| | Blue clay ... .. ... | 147 | 0 | |
| | Green rock (fossils) ... ... | 4 | 0 | (*Cephalopoda bed.*) |
| | *Binds (fossils) ... ... ... | 1 | 0 | |
| | Green rock .. ... ... | 6 | 0 | (*Fish bed.*) |
| | Rock binds ... ... ... | 2 | 0 | |
| "*Spinatus*" zone. | Hard green rock (fossils) ... ... | 7 | 6 | (*Rock bed.*) |
| | Strong rock binds (fossils) ... ... | 2 | 6 | |
| | Hard binds ... ... ... | 3 | 6 | (*Hard bed.*) |
| | Binds (fossils) ... ... ... | 8 | 0 | |
| "*Margaritatus*" zone | Hard grey rock ... ... ... | 2 | 6 | (*Hard bed.*) |
| | Rock binds ... ... ... | 3 | 6 | |
| | Light coloured rock ... ... | 1 | 6 | |
| | Clay with bands of ironstone, cement stones, shell bands, &c. ... ... | 545 | 0 | (*23 Hard beds.*) |
| | Bottom of Lower Lias clay ... ... | 738 | 0 | |

* Binds. A miner's term for tough shales or clays. Not very precise in its meaning.

Section of the "Spinatus Zone" of the Middle Lias of Northamptonshire with the approximate thickness of the beds.

1 Hard calcareous and ferruginous rock, very fossiliferous. 6 Feet.

2 Marly clay. 2½ Feet.

3 Sandy limestone 4 im. to 4 feet.

4 Sandy or Marly clay 2ft. 7ins. to 8 feet.

S.J.N.

The above is the account given by the miners who sank the first shaft, and it was given to me a long time before the publication of Mr. Eunson's paper on the boring.† I think the account may be relied upon for giving the sequence of beds, but I feel perfectly certain that the thicknesses of the *hard beds*, especially the upper ones, is very much exaggerated; and since the total thickness of the beds is just about correct (see Mr. Eunson's paper) some of the other beds must be understated to an equal amount.

My reason for accepting the sequence of beds and doubting the figures rests upon the following considerations:—The beds below the *Rock-bed* agree well, in number, with those at GAYTON, (see forward,) and the beds above the *Rock-bed* with those that can be seen at BUGBROOK, MILTON, and a number of other places; but the thicknesses of the two uppermost hard beds—the *Cephalopoda bed** and the *Fish and Insect bed*—are enormously greater that I have anywhere found them to be. I have seen these two beds in at least a dozen places in the county, and nowhere have they been above 9 inches and 6 inches respectively, in thickness, and in the majority of cases less. But the chief reason for not accepting the figures rests on the fact that I have myself measured the *Cephalopoda bed* and the *Fish and Insect bed*, within a mile of the section I am now speaking about, and I found them to be 9 inches and 5 to 6 inches, respectively, in thickness. Through the kindness of Mr. J. Eunson, F. G. S., I was permitted, about a year-and-a-half ago, to see the operations being conducted at the bottom of the old well on the Billing Road for increasing the water supply, where headings were being driven on the top of the Marlstone, and through the very beds I am now noticing. The measurements I then made gave the figures quoted above. The two clay beds between the *Cephalopoda bed* and the *Rock-bed* were 2ft. 8in. and 2ft. 6in., respectively, in thickness, as compared with 1ft. and 2 feet in the report of the miners on the Kettering Road well.

The sequence of beds at the boring at GAYTON is as follows:—

| | | ft. | in. |
|---|---|---|---|
| 1. | Surface soil ... ... ... | 1 | 0 |
| 2. | Alluvial clay ... ... ... | 7 | 0 |
| 3. | Shale, with limestone of the *Fish and Insect bed* ... ... ... ... | 0 | 4 |

† See "Account of the late Boring on the Kettering Road, Northampton," by J. Eunson, C.E., F.G.S., F.M.S., in part ix. of this Journal.

* In the South West of the county there are two hard *Cephalopoda beds*, but I have not found two near Northampton.

| | | | | | | |
|---|---|---|---|---|---|---|
| "*Spinatus*" zone. | 4. | Limestone rock with *Rhynchonella tetrahedra* ... ... ... ... | 2 | 8 | (*Rock-bed.*) |
| | 5. | Clay ... ... ... ... | 2 | 8 | |
| | 6. | Limestone rock with *Protocardium truncatum* ... ... ... ... | 4 | 4 | |
| | 7. | Clay ... ... ... ... | 7 | 0 | |
| "*Margaritatus*" zone. | 8. | Rock ... ... ... ... | 2 | 3 | |
| | 9. | Sandy clay, very micaceous, with *Ammonites margaritatus* ... ... | 6 | 6 | |
| | 10. | Rock ... ... ... ... | 0 | 9 | |
| | 11. | Clay ... ... ... ... | 2 | 0 | |

Below this there is nothing at all resembling the hard beds of the Middle Lias, nor, so far as I know, any sandy beds resembling the soft beds of the "*margaritatus*" zone.

I have, in the above section, only given sufficient to show the development of the "*spinatus*" and "*margaritatus*" zones at Gayton, because Mr. H. Eunson, F.G.S., is keeping an account of the beds and fossils, &c., with the object of giving a paper to the Society at some future date.

The following are a few sections in which the "*spinatus*" zone is represented, and which can still be seen :—

### Section on Stirch Farm.

About one mile S.S.W. of Hellidon (1½ miles by road).

| | | ft. | in. |
|---|---|---|---|
| 1. | Soil with limestone blocks ... ... ... | 2 | 0 |
| 2. | Light brown clay with remains of *Cephalopoda bed* in upper part of it ... ... ... | 1 | 9 |
| 3. | Fish-bed ... ... ... ... | 0 | 4 |
| 4. | Transition-bed, both hard and soft, with *Ammonites acutus* and many *gasteropods* ... ... | 0 | 3 |
| 5. | Rock-bed, containing the usual fossils in abundance : *Pectens*, *Rhynchonellæ*, &c. The stone very hard and green-hearted, but a band of broken shells, ossicles, &c., similar to that found on Blackdown Farm ... ... ... ... | 6 | 0 |

Near to Badby, in the cricket field, and near to the road leading to Everdon, there is a shallow section of the Marlstone.

SECTION NEAR TO BADBY.

| | | ft. | in. |
|---|---|---|---|
| 1. | Soil ... ... ... ... ... | 1 | 0 |
| 2. | Light grey marly clay, with fragments of *Cephalopoda* and *Transition beds* ... ... ... | 1 | 0 |
| 3. | Hard rock, depth unknown, but probably about 4 feet. It is very much obscured below because it has not been worked for a considerable time, containing :— | | |

*Belemnites (rather plentiful)*
*Cryptœnia consobrina ?*
*Pectens*
*Pecten textorius*
*Ostrea*
*Modiola*
*Protocardium truncatum (abundant)*
*Phaladomya ambigua*
*Adarte striato-sulcata*
*Cardinia sp. ?*
*Pleuromya costata*
*Terebratula punctata (a few)*
*Rhynchonella tetrahedra (one large specimen)*
*Pentacrinite, &c.*

This section I have found rather puzzling. At first I considered it to be the *Rock-bed*, because it looked very much like it, and because it was capped by fragments of the *Cephalopoda bed*, and in one part by a soft marly stone abounding in minute Gasteropods, just about like that coming from the *Transition bed*. When I came to consider the fossils, however, I thought it necessary to give this a place lower down. *Rhynchonellæ* were peculiarly absent (I could only find one), and *Cardium truncatum* was very abundant. I have never found it so in the *Rock-bed* ; and within two miles of this—near ARBERY HILL—the *Rock-bed* has its normal characters. I have in this paper provisionally considered the rock at Badby as bed No. 3.

About one-third of a mile further from BADBY another section similar to the above is to be seen. It is a ferruginous shaley rock dipping 5° northwards, and containing :—

*Pecten liasinus (abundant),*
*Belemnites,*
*Terebratulæ,*

and *Crystallized carbonate of lime*, very much like that found in the lowest

bed at Chalcomb and Staverton. I could find no *Rhynchonellæ* here, nevertheless it seemed more like the *Rock-bed* than the one nearer Badby.

To the west of BADBY a few sections of the Marlstone can still be seen, the *Rock-bed* presenting its normal appearance. Three of them are by the side of the road leading from BADBY to CATESBY. The one nearest to Badby scarcely requires notice, and that nearest to Catesby has been mentioned in a previous paper. The other one is close by the side of ARBURY HILL, near to a farm-house; it consists of the *Rock-bed* capped by fragments of the *Cephalopoda* and *Transition beds*. The fragments of the atter are nearly all hard here, but the usual fossils—*Ammonites acutus*, and small *Gasteropods*—are abundant.

The following were obtained from the Rock-bed :—

*Belemnites*
*Pecten liasinus*
*Cardinia concinna (Sow.)*, or *Cardinia philea (D'Orb.)*, *(large specimens)*
*Rhynchonella tetrahedra*
*Terebratula punctata*
*Waldheimia resupinata.*

I noticed here a few small pebbles in the stone, and I think I have seen them before in the *Rock-bed*.

The neighbourhood of DODFORD used to be a good one for Marlstone sections—Dodford itself is built chiefly of Marlstone—but I have only been able to find two in the neighbourhood.

In a field about half-a-mile N. of DODFORD a thin section is to be seen. The rock is close to the surface, and it is a rubbly light-brown stone like it usually is in superficial beds.

Fossils :—

*Rhynchonella tetrahedra*
*Do. do. var. Northamptonenses (plentiful)*
*Terebratula punctata (plentiful)*
*Pecten liasinus (abundant)*
*Pecten æquivalvis*
*Plicatula spinosa*
*Belemnites.*

In this section there is a vertical band of *calc spar* filling up a crevice in the rock.

The other section is nearer to NORTON than DODFORD, but requires no particular mention

## DESCRIPTION OF THE BEDS OF THE "SPINATUS" ZONE.

BED NO. 4.—This, the lowest bed of the "*spinatus*" zone, is a sandy or marly clay, containing concretionary ferruginous nodules, which I believe are very unfossiliferous. The thickness of this bed is, at BYFIELD about 2ft. 7in., GAYTON 7ft., and NORTHAMPTON 8ft.?; and, supposing I have given the hard bed near to Badby its correct place, the bed I am now describing must be at least 7ft. in thickness at BADBY. The road has been cut through a light brown sandy clay (not calcareous) very near to, and a little below, the hard bed.

BED NO. 3—This bed is a sandy limestone, rather soft and shaley at BYFIELD and WATFORD, harder and more compact at BADBY, but in all three places abounding in fossils. The thickness of this bed appears to be at BYFIELD 4in., WATFORD 2ft. 3in., BADBY 3 to 4 feet, GAYTON 4ft. 4in., and NORTHAMPTON, 3ft. 6in.?

Fossils from this bed :—

| | |
|---|---|
| *Belemnites* ... ... ... | *Watford, Badby* |
| *Cryptænia consobrina* ... ... | *Badby* |
| *Ostrea* ... ... ... | *Ditto* |
| *Pecten liasinus*... ... ... | *Byfield, Badby* |
| *Pecten textorius* ... ... | *Badby* |
| *Astarte striato-sulcata* ... ... | *Do., Watford? Bugbrook?* |
| *Limea acuticosta?* ... ... | *Byfield* |
| *Cardinia sp.?* ... ... ... | *Badby, Bugbrook* |
| *Protocardium truncatum (plentiful)*... | *Byfield, Badby, Watford, Northampton* |
| *Pholadomya ambigua?* ... ... | *Badby* |
| *Pleuromya costata* ... ... | *Ditto* |
| *Terebratula punctata* ... ... | *Byfield, Badby* |
| *Rhynchonellæ tetrahedra* ... ... | *Badby* |
| *Pentacrinite stem* ... ... | *Ditto* |
| *Serpulæ?* ... ... ... | *Ditto* |

Good specimens of *calc spar* from *Badby*.

BED NO. 2.—This is described as a marly clay containing concretionary ferruginous nodules by Mr. E. A. Walford, F.G.S., in his description of the cutting at Byfield. I have never yet been able to examine it. Thickness,—at BYFIELD 1ft. 6in., GAYTON, 2ft. 8in., and NORTHAMPTON 2ft. 6in.?

BED NO. 1.—This, the most important bed of the Middle Lias, is commonly called the *Rock-bed*. It is a hard, calcareous, and ferruginous

rock, of a grey, green, blue, or brown colour. When got from a good depth below the surface it is of a blue or green colour—in some cases it is difficult to say which—on account of the iron in it being in the form of the *protoxide*. In superficial beds the iron is chiefly in the form of the *peroxide*, and this gives the stone a reddish brown appearance, but commonly the interior of blocks, even from these beds, is of the original colour. The stone has been used largely for building and road making, and it is still used, on a small scale, for these purposes. It is sufficiently ferruginous to be worked for iron in a few places, and has been so worked at KING'S SUTTON, near Banbury. The calcareous matter in it is considered an advantage because it acts as a flux. Occasionally it is very sandy, and can scarcely be distinguished from the *Northampton Sand* by its mineralogical characters alone. At BYFIELD it is very red and sandy.

It is usually very full of fossils, and sometimes bands are met with made up almost entirely of *ossicles*, *serpulæ*, and *fragments of shells*. It is also quite a common thing to find in it beds made up of shells of *Rhynchonella tetrahedra*, and rather less commonly of *Terebratulæ*. Usually the shells contain beautifully crystallized *calc spar*.

Large *Belemnites* are common in this bed, and serve to distinguish it from the *Northampton Sand* in which few are found.

Professor Judd speaks of the occurrence of *flattened nodules* or *concretions of argillaceous limestone* in certain beds, more particularly in the lower part. I have only noticed these in one place—Ward's Farm, near to BUGBROOK, and there they assumed some very fantastic shapes.

The thickness of this bed varies very little, comparatively, in the area I am speaking of in this paper. In most cases it is between 5 and 6 feet in thickness, but near Byfield it reaches about 11 feet.

The characteristic ammonite, *A. spinatus*, is by no means plentiful. I have not been fortunate enough to find one myself. Mr. Walford, of Banbury, has only found one in the district in which he has worked. Mr. W. D. Crick found one at THENFORD, and there is a rather doubtful specimen in the collection at the Science School, from BUGBROOK.

In the list of fossils below I have omitted the localities in the case of those that are found in almost every section containing this bed.

| | |
|---|---|
| *Ammonites spinatus*... | ... *Thenford, Bugbrook? Aston-le-Wall* |
| *Ammonites Holandrei* | ... *Bugbrook* |
| *Belemnites* ... | ... |
| *Eucyclus concinnus?* | ... *Bugbrook* |

| | |
|---|---|
| *Actæonina ilminstrensis?* ... | *Bugbrook* |
| *Ostrea* ... ... ... | *Dodford, Bugbrook, &c.* |
| *Plicatula spinosa* ... ... | *Dodford* |
| *Pecten liasinus* ... ... | |
| *Pecten æquivalvis (dentatus, &c.)* | |
| *Hinnites Davœi* ... ... | *Bugbrook? Aston-le-Wall* |
| *Hinnites velatus* ... ... | *Aston-le-Wall* |
| *Cardinia concinna* or *Cardinia philea* ... ... | *Catesby* |
| *Arca (Macrodon) liasina?* ... | *Bugbrook* |
| *Lima punctata* ... ... | *Bugbrook, Aston-le-Wall* |
| *Waldheimia resupinata* ... | *Blackdown, Catesby, Byfield, Milton* |
| *Waldheimia indentata* ... | *Byfield, Chipping Warden, Aston-le-Wall, Appletree* |
| *Terebratula mariæ (D'Orb),* / *,, indecusata (Sow.)* | *Thenford, Aston-le-Wall* |
| *Terebratula cornuta* ... | *Blackdown* |
| *Terebratula punctata* ... | |
| *Terebratula Edwardsi* ... | |
| *Rhynchonella tetrahedra* ... | |
| *Rhynchonella tetrahedra Var. Northamptonensis* ... | *Edgcott, Blackdown, Dodford, Bugbrook* |
| *Ossicles and fragments of shells in masses* ... ... | *Blackdown, Stirch, & Preston Capes* |
| *Wood* ... ... ... | *In many places* |
| *Calc spar* ... ... | *Dodford, and in the shells almost everywhere* |

## List of Fossils from the "Spinatus" Zone of the Middle Lias of Northamptonshire.

In the list of fossils below I have included a number from the neighbourhoods of Byfield, Chipping Warden, Aston-le-Wall, and Appletree, &c., that I have not been able to obtain myself. These are taken from Mr. Walford's pamphlet "On some Middle and Upper Lias Beds in the neighbourhood of Banbury," and I have indicated them by an asterisk (*).

It gives me considerable pleasure to acknowledge the assistance I have had from Mr. Walford in the preparation of these papers, both personally and in the use of his pamphlet referred to above.

Mr. Walford only gives the zone from which his fossils came, and although I believe they nearly all came from the bed No. 1—the *Rock-bed*—I have thought it best not to give the beds as I did in the last paper.

REPTILIA.

*ICHTHYOSAURUS VERTEBRA. Aston-le-Wall.

PISCES.

*HYBODUS-SPINE. Aston-le-Wall.

CEPHALOPODA.

AMALTHEUS SPINATUS, *Ammonites spinatus* (Bruguière), *A. Hawskerensis* (Young & Bird, Phillips, &c.), *A. Birdi* (Simpson), *A. exasciatus* (Simpson). This is the characteristic ammonite of the zone, and although fairly plentiful in some parts, it is rather rare in Northamptonshire. I only know of three specimens from the district.

STEPHANOCERAS HOLANDREI? *Ammonites Holandrei* (D'Orbigny).

BELEMNITES are usually very plentiful in the *Rock-bed*, but I have not attempted the identification of any. The species most abundant are *B. paxillosus* (Schloth.), and *B. Elongatus* (Sow.)

GASTEROPODA.

CRYPTÆNIA CONSOBRINA (Tate).

EUCYCLUS CONCINNUS?

*CHEMNITZIA sp.? Byfield.

ACTÆONINA ILMINSTERENSIS (Moore), *Actæon tessellatus* (Tate).

LAMELLIBRANCHIATA.

*OSTREA SUBMARGARITACEA (Brauns). Appletree.

*OSTREA SPORTELLA (Dumortier). Aston-le-Wall and Appletree.

*OSTREA CYMBII (Oppel). Byfield.

PECTEN LUNULARIS (Römer), *P. liasinus* (Nyst), *P. lamellosus* (Sow., &c.), *P. pulchellus* and *P. planus* (Simpson). This pecten is circular, and nearly smooth; it is very abundant both in the "*margaritatus*" and "*spinatus*" zones, and although it is generally small, large specimens may occasionally be found.

PECTEN TEXTORIUS (Schlotheim). Aston-le-Wall, Appletree, Badby.

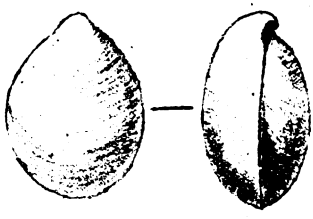
PECTEN ÆQUIVALVIS (Sow.), *P. sublævis* (Young & Bird, Simpson, Oppel), *P. major* (Young & Bird, Simpson, and Phillips), *P. aheneus*, *P. rudis* (Simpson). This common fossil in the Middle Lias is often met with of large size, and having bold costæ or ribs; it is called æquivalvis because the valves are nearly uniform. *P. dentatus* is also

Ammonites spinatus.

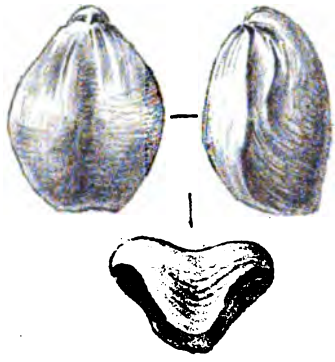
Pecten aequivalvis.

Rhynchonella tetrahedra.

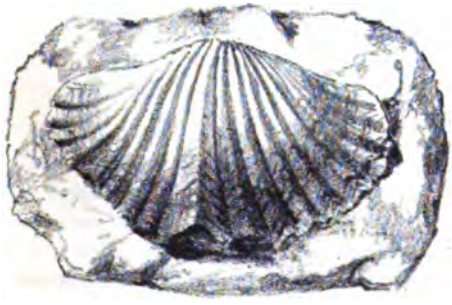
Rhynchonella tetrahedra,
var. Northamptonensis.



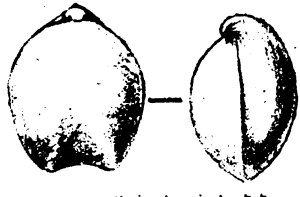
Terebratula punctata.



Waldheimia resupinata.



Spiriferina oxyguna



Waldheimia indentata.

S. J. Newman. del. et

a variety of *æquivalvis*, and I have found this more common than the large typical form. I have not given a figure of dentatus because I have not one perfect specimen.

*PECTEN DEMISSUS, or *P. disciformis* (Schüb.) Chipping Warden.

*HINNITES TUMIDUS (Zieten). Aston-le-Wall.

HINNITES DAVÆI (Dumort).

*HINNITES VELATUS (Goldf.) Aston-le-Wall.

LIMA PUNCTATA (Sow.) *Plagiostoma punctata.*

*LIMA HERMANNI (Voltz). Aston-le-Wall.

LIMEA ACUTICOSTA (Münster). Se former paper.

PLICATULA SPINOSA (Sow.)

*PLICATULA LÆVIGATA (D'Orb.) From beds below the Rock-bed at Byfield.

*AVICULA sp. ? Aston-le-Wall.

*GERVILLIA. Aston-le-Wall.

*MYTILUS NUMISMALIS (Oppel), *Modiola numismalis* (Oppel). Chipping Warden.

*MACRODON CLEVLANDICUS (Tate)? *Cucullæa.* Aston-le-Wall.

MACRODON LIASINA? *Arca liasina.* Bugbrook.

*TRIGONIA LINGONENSIS (Dumortier). Aston-le-Wall, Appletree, and King's Sutton. A rather rare fossil.

ASTARTE-STRIATO-SULCATA (Römer), *A. amalthei* (Quenstedt).

CARDINIA CONCINNA (Sow.), *Unio concinnia* (Sow.), *Pachyodon lanceolatus* (Stutchbury). The specimen I have agrees equally well with

CARDINIA PHILEA (D'Orb.)

CARDINIA HYBRIDA, *Unio hybrida* (Sow.) A variety of *Cardinia Listeri* (Sow.) Appletree, Bugbrook.

CARDINIA sp. ?

*ISOCARDIA sp. ? Aston-le-Wall.

PROTOCARDIUM TRUNCATUM (Sow.) See former paper.

PHOLADOMYA AMBIGUA? (Sow.) See former paper.

PLEUROMYA COSTATA (Young & Bird). See former paper.

*CEROMYA PETRICOSA? (Simp.), *Venus petricosa* (Simp.), *Isocardia liassica* (Moore). Aston-le-Wall.

BRACHIOPODA.

*SPIRIFERINA OXYGONA (E. Desl.) Found first in Normandy. Fine specimens occur at King's Sutton, Northamptonshire, some of which from Mr. Beesley's collection have been figured by Dr. Davidson in his Jurassic Brachiopoda. In well preserved shells the surface is seen to be covered with spinules. It is one of the rarest of our Middle Lias fossils. The specimen figured is from Mr. E. A. Walford's cabinet.

TEREBRATULA PUNCTATA (Sow.) This, and the varieties of it, *T. subpunctata* (Dav.), *T. Edwardsi* (Dav.), &c., are very common fossils in the "*spinatus*" zone. (See figure).

*TEREBRATULA PUNCTATA, VAR. RADSTOCKIENSIS (Dav.) Chipping Warden.

*TEREBRATULA SUBPUNCTATA (Dav.) Byfield.

TEREBRATULA EDWARDSI (Dav.)

TEREBRATULA WALFORDI (Dav.) Byfield, Aston-le-Wall. A new species named after Mr. Walford of Banbury.

WALDHEIMIA RESUPINATA (Sow.) (See figure).

WALDHEIMIA INDENTATA (Sow.), *Terebratula indentata, Waldheimia cornuta.* (See figure.)

WALDHEIMIA MARIÆ (D'Orbigny), *Terebratula Mariæ, T. indecusata.* Byfield, &c.

*WALDHEIMIA SUBNUMISMALIS (Dav.) Byfield.

*WALDHEIMIA FLORELLA (D'Orb.) Byfield.

RHYNCHONELLA TETRAHEDRA (Sow.), *Terebratula compressa* (Simp.) This is perhaps the most abundant fossil in the "*spinatus*" zone, hundreds, and even thousands being found together. The bands of this fossil are commonly called "*Jacks*" by quarrymen, and the term is often used now by others. The specimen figured is a very fine one from Edgcott.

RHYNCHONELLA TETRAHEDRA, VAR. NORTHAMPTONENSIS (Sow.) (See figure).

ANNELIDA.

SERPULÆ.

ECHINODERMATA.

PENTACRINUS.

POLYZOA.

*DIASTOPORA LIASSICA (Goldf.) Appletree.

PLANTÆ.

WOOD. Wood is very commonly met with in the *Rock-bed.*

B. THOMPSON.

## MEETINGS OF THE SOCIETY.

### OCTOBER, 1882.

On Tuesday, the 3rd, a meeting of the Botanical, Ornithological, and Microscopical Sections was held in the Curators' Room, Guildhall, when various specimens were exhibited by Messrs. Kempson, Eunson, Gregory, and Crick.

On Tuesday, the 17th, a meeting of the Geological, Entomological, and Meteorological Sections was held. Mr. W. D. Crick gave a description of the excursion to Belvoir Castle by the Midland Union in June last, dealing especially with the Geological features of the country traversed. Mr. F. Law's Meteorological report for September was read. Messrs. Elkington and Tomalin exhibited Entomological specimens.

On Tuesday, the 31st, a meeting of the Botanical, Ornithological, and Microscopical Sections was held—many interesting Microscopical objects were shewn by Messrs. A. Kempson, E. A. Durham, and C. E. Crick.

### NOVEMBER.

On Tuesday, the 14th, the sections Geology, Entomology, and Meteorology met. Messrs. W. A. Smith and Thos. Green were elected members of the Society. Mr. F. Law presented his Meteorological report for October. Mr. H. Eunson gave a short description of the manufacture of dynamite, referring especially to its manufacture in Scotland, where deposits of diatomaceous earth have been found peculiarly favourable for the absorption of the nitro-glycerine.

A very successful Soirée was held on November 23rd, at the Grammar School, Northampton. A large number of specimens were exhibited by the members of the Society. The Rev. S. J. W. Sanders, M.A., gave an address upon "Museums and Our Museum" (the substance of which will appear in the Journal). The Rev. G. Nicholson, B.A., followed with an interesting paper upon "The Locomotive Power of Birds,"—remarking upon the beauty and grace of their various motions, he proceeded to describe the locomotion of the denizens, respectively, of land, water, and air, in walking and running, flying and soaring, swimming and diving, taking as three striking illustrations the ostrich, the auk, and the frigate bird, with illustrative diagrams. Mr. Beeby Thompson, F.C.S., then read a paper upon "Comets," describing their orbits and periods, their various appearances, changes, and structure, concluding with a reference to the comet then visible.

On Tuesday, the 28th, a meeting of the Botanical, Microscopical, and Ornithological Sections was held. Mr. Godfrey read a few notes upon "The Liver-fluke," as described by Mr. A. P. Thomas, M.A. Mr. R. G. Scriven followed upon the same subject, remarking that the meadows of the Nene valley were notably unsafe for sheep after floods. Mr. W. D. Crick made some remarks upon the localities where Limnea trunculatus is to be found, this snail being a favourite host of the liver-fluke in one of its stages. Mr. S. J. Newman made some remarks upon "Colour," showing, by numerous illustrations of insects, birds, snakes, and quadrupeds, the difference between coloured markings which follow structural arrangement, and colouring apparently due to sexual selection, or the survival of the fittest, especially noting the markings on lepidoptera, and the strange colouring about the head and neck of many aquatic birds.

## DECEMBER.

On Tuesday, the 12th, the Geological, Entomological, and Meteorological Sections met. Mr. F. Law read his Meteorological report for November. Mr. R. Rogers contributed a paper upon "The Holly," noting the superstitions connected with it, the age and size it sometimes attains, and other details of interest.

The following were elected members:—The Rev. G. H. Rigby, Yardley Hastings, the Rev. Chas. Brooke, Grendon, the Rev. H. E. B. Arnold, M.A., and Mr. R. Croft.

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MR. J. L. CHERRY, a corresponding member of our Society, has just been elected Honorary Secretary of the Stafford Scientific Institute and Field Club.

THE BEECH TREE AT BILLING HALL.

*Printed by the Woodbury Permanent Printing Company from a Negative by Mr. Charles Lane.*

*ted by the* ».

## TREES OF NORTHAMPTONSHIRE. XIII.

### The Beech Tree at Billing Hall.

"The warlike beech."—*Spenser*, Faerie Queene.

There is no tree which is a greater favourite with the poet and the artist than the beech, which has been fitly termed by Gilbert White "the most lovely of forest trees." It is beautiful at all seasons, from the winter, when its bare stems, smooth and clean, stand among the under growth like pillars of marble, to the autumn, when it puts on the most gorgeous colouring of any tree in the forest. But perhaps it is most beautiful in the spring, when the young leaves break out of their horny cases, "of a glade lighte greene" as Chaucer says, and fringed with a most delicate edging of light silvery down. There are some groves and avenues of young beeches, leading up to the Northampton and Wellingborough road near Ecton, which at this season are well worthy of a visit. Its most noteworthy characteristic, however, is that the smoothness of its bark renders it more liable than any other tree to be made a tablet for rude inscriptions. This custom is most probably of very ancient date, as it appeals to one of the commonest instincts of humanity. It is mentioned both by Virgil and Ovid, but as the latter more particularly speaks of the beech, his lines must suffice :

Incisæ servant a te mea nomina fagi ;
Et legor Œnone, falce notata, tua.
Et quantum trunci, tantum mea nomina crescunt :
Crescite, et in titulos surgite recta meos.

Again, in *As you like it*—

"There is a man haunts the forest that abuses our young plants with carving *Rosalind* on their barks.

The Beech tree thrives upon nearly all soils, but best of all upon those of a lighter character and containing lime. The tree which is the subject of our illustration is a splendid specimen. It is as Evelyn quaintly says of "a stupendous procerity," being 106 feet high to the topmost branches, or 4 feet higher than the Willow at Fawsley—the highest tree we have yet recorded. At 5 feet from the ground it measures 15 feet 6 inches in circumference. It stands in the grounds at Billing Hall, a short distance only from the road leading from the main road down to the village of Billing. A little further on near the entrance is a fine old Elm, which measures 25 feet 6 inches in circumference.

The photograph was taken when the ground was covered with snow, on the 8th March, 1883.

# NOTES ON THE BIRDS OF NORTHAMPTONSHIRE.

By Lord Lilford, F.L.S.

92. Rook. *Corvus frugilegus.*

This is another of our British birds which is so abundant in almost all parts of our islands, and so well known to our people, and about which so much has been written, that it seems almost presumptuous to suppose that we can say or write anything new; but to the inquiring ornithologist there are still several matters in the habits and domestic economy of the Rook upon which information and explanation would be most acceptable. We imagine that there can be few districts in which this species is more common than in ours, or in which greater facility of observation of the manners and customs of this "ancient family" can be at all seasons afforded by nature to a student of bird-life. Here at Lilford, at all events, we shall not be going beyond the mark in stating the number of Rooks' nests within a radius of three miles from the house at from fifteen hundred to two thousand, and have but little doubt that the actual number may be not far from double the last-named figure. If the weather is mild, our Rooks crowd into their rookeries early in February, and set about marrying and giving in marriage, the restoration of nurseries, and distribution of (family) seats; but several weeks generally elapse in incessant talk and argument, love-making, and perhaps arrangements of marriage-settlements, before the building operations are commenced. [We had written thus far, when, on reference to our friend Professor Alfred Newton's edition of 'Yarrell's British Birds," we discover that we have virtually been almost quoting his words, and, although convinced that we could do no better, think it only right to acknowledge our obligation, and ask, "*Is* there nothing new under the sun?"] To resume, and make what really is a long matter short, the eggs are generally five, sometimes six; we know of no instance in which eight were found in the same nest; they vary but little in colour, and are generally hatched in the second and third weeks of April. The appearance of the young birds at the edge of the nests, or on the boughs immediately surrounding them, depends much upon the weather; if it is mild and showery, and food consequently abundant and easily found, we fancy that the rapid growth of the closely packed young produces such intolerable heat in the nests, that they will scramble out as soon as they are able to do so; whilst in the cold and ungenial weather which is now, unfortunately, so frequent during May, the young Rooks will remain huddled together in the

nests till they are nearly full-fledged, and two or three of the family fully occupy all the limited nursery accommodation. From our former experience here, we fix the 10th of May as about an average day for the Rooks to be "fit" for shooting with the rifle, but have often seen strong flyers on and before that day, and, on the other hand, have known some seasons in which hardly a young Rook could be discovered as a mark for our bullets before May 15th. About the end of June (when, as a rule, the young Rooks are strong on wing and well able to procure their own living) the great majority of our birds leave our neighbourhood altogether for some weeks, and whither and why they go is one of the points above alluded to, upon which "we have yet to learn." Do they visit the seaside for salt air and bathing? or do they go on a continental tour? Be this as it may, it is very certain that our rookeries and favourite rook-roosts, which are by no means always identical, are, comparatively speaking, deserted till the latter part of July or the beginning of August, when the wanderers return and swarm over our pastures in company with Jackdaws and Starlings. We notice that the main body of our Rooks always return to their roosting-place from the north-east, though many considerable parties flock in also from all points of the compass. About the beginning of October, not only all our home-bred Rooks, but almost all those from the rookeries within, roughly speaking, a radius of some miles, crowd into a wood near this house known as the Lynches, in which many hundreds of these birds are annually bred; but at the date just mentioned and during the winter few Rooks spend the night in the old bare-topped ash trees in the lower part of the said wood in which the majority of the nests are fully exposed to our prevalent winds from west and south-west, but cluster in the elms, oaks, and few firs all over the upper portion of the covert. In common with most of the Crow family, the Rook is omnivorous; and whilst fully admitting the immense good done by the birds in the destruction of noxious insects, we cannot defend our friends from the charges brought against them, with perfect truth, by farmers and gamekeepers, of the damage done by their taste for corn, both in grain and blade, and for eggs fresh and incubated. It is true that we suffer more from this last propensity in a dry season that a moist one, for the obvious reason that, owing to the abundance of vegetation in the latter, the eggs of game and other ground-nesting birds are better concealed; but our Partridges especially owe their safety to this cause, and not to any lack of searching on the part of the Rooks. An observant and accurate naturalist and well-known falconer in West Norfolk used to assure me that he could detect an egg-stealing Rook at half-a-mile's distance by its manner of flight, and, being an ardent sportsman, he always preferred a flight at one of these oophagous rascals to any other that his district could then afford. We

annually lose great numbers of the eggs laid by the pinioned Ducks of many species about our aviary-pond from the raids of these black robbers, who will even penetrate into the nesting-hutches in which some of the wildfowl lay, and fly off with the eggs on their beaks, no doubt sucking them as they go. We also notice that our Rooks are extremely fond of walnuts and the acorns of the evergreen oak. Whether the damage done by these birds is atoned for by their good works in the destruction of insects is an open question: personally we are inclined to give the Rook the benefit of the doubt; but in such a Rook-haunted neighbourhood as ours it is certainly absolutely necessary to keep down their numbers by shooting down their young pretty closely every year. One of the most curious ornithological sights to be witnessed in this neighbourhood is a Rooks' parliament or meeting, which, with us, generally takes place in the autumn months, and invariably in one of three special places, about an hour before the time for retiring to roost: in one of these spots, a portion of a meadow close to this house, we have seen some ten acres of ground so thickly occupied by Rooks that scarcely a sign of the grass upon which they were assembled was discernible from a few hundred yards' distance, whilst great numbers were collected in the adjoining trees, and many plunging headlong from great heights in the air and darting and twisting in all directions; those upon the ground were for the most part comparatively silent, but the occupants of the "gallery," if I may so call the trees, were, as is usual in similar assemblages, very vociferous. We have seen many such meetings, but never such a densely packed one as that observed one afternoon in early October some fifteen years ago in the meadow above mentioned, and followed, as is generally the case, by a heavy gale of wind. Here is another of the mysterious habits of the Rook, which has, no doubt, been observed by many, but which, to our knowledge, has never been explained. Rooks travel long distances in search of food; and I am assured that those which frequent the demesne of Powerscourt, at a short distance from Dublin, are in the constant habit of crossing to the Welsh coast in the morning and returning at evening. In most parts of Europe which border on the Mediterranean the Rook is a winter visitant and a very local one. In certain parts of Andalucia vast flocks appear in December, whilst in others it appears to be entirely unknown. From all we can learn, we are inclined to consider the British Islands the principal cradle of the European Rook, though it is recorded by Yarrell (4th edition, pp. 300, 301) as breeding in various parts of Northern and Central Europe, as also in Asia. I have often been told by seafaring men that they have occasionally found the rigging of their vessels crowded with Rooks in foggy weather whilst voyaging in the North and Baltic Seas.

93. JACKDAW. *Corvus monedula.*

This amusing but most pernicious bird is extremely common in our county, and probably only too well known to most of my readers. In the hollow trees about the park and pleasure-grounds at Lilford they used to swarm at the breeding-season, till we found it absolutely necessary to wage war upon them in the interests of our garden, poultry, and game, to say nothing of those of the Barn-owl, a species for which we have always entertained a sincere respect and affection. The Daws not only carried off numbers of young chickens, pheasants, and partridges, and committed havoc amongst our green-peas and other vegetables, but in several instances, to our knowledge, took possession of the Owls' nests, destroyed their eggs, and piled up their own nests in the cavities selected by the harmless and most useful bird of night; occasionally, however, the tables are turned, as we have previously mentioned when treating of the Barn-Owl. For these and other misdemeanours we have for some years past made a practice of shooting the old Jackdaws and destroying their nests and eggs wherever we found them, with the result of decided benefit to ourselves and our neighbours. The Jackdaw disputes the palm for noisy and obtrusive impudence with the House-Sparrow, and does not, to our knowledge, compensate us in any way for his misdoings, as the latter undoubtedly does to a great extent. That the Daw fulfils his duties in the great scheme of Nature I do not deny, but must confess that I am unable to discover what they may be. This bird, in our inland counties, nests in hollow trees and buildings of all kinds, and generally accumulates a vast quantity of sticks, wool, and rubbish for that purpose; but no rule is without an exception, and we have in this neighbourhood met with two instances of Jackdaws taking posssesion of the nests of Wood-Pigeons (*Columba palumbus*) situated in fir trees, and laying their eggs therein without any addition to the fragile structure of twigs arranged by the rightful owners. On our sea-cliffs many Jackdaws breed in holes and crevices, and in some localities of this kind are accused of having driven away the Red-legged Chough, better known perhaps as the Cornish Chough (*Pyrrhocorax graculus*), from their breeding-places; in one instance, at least, we have reason to believe that this charge is well founded. I may here mention that in Cornwall I found the present species is often called Chough by the country people, and the real Chough better known as the Red-legged Daw, or Killigrew Crow. I have often heard the name of Chough applied to the Grey Crow (*Corvus cornix*) in various parts of England. In open treeless counties the Jackdaw will frequently nest in rabbit-burrows and the crevices of abandoned quarries and chalk-pits. In the old walnut tree at Pilton, of which an excellent photograph appeared in No. 10 of our 'Natural History Journal' (not too soon, for I regret to say

that it has recently lost another large branch), a great many Jackdaws are in the habit of nesting and playing havoc in the adjacent rectory garden; and here they appear to live in amity with the Barn-Owls, Stock-Doves, and many other hole-breeding birds to which the ancient tree in question has long afforded suitable abodes. We go into no details as to the nests and eggs of this species, as they are probably well known to all our readers. In Spain the Jackdaw is a very local bird—*e. g.* it is almost unknown at Seville, whilst at Lomo del Grullo, some twenty-five miles from that city, we found it breeding in abundance in the ruined walls of the old royal shooting lodge and the hollow trees in its immediate neighbourhood. In Cyprus, also, we found the Jackdaw at Famagosta only. The habits of this bird in semicaptivity are amusing, as are those of most of the Crow family; but its power of imitation is not equal to those of the Raven, Magpie, or Jay, although in petty larceny the Jackdaw is surpassed by no bird with which we are acquainted. In winter many Jackdaws roost amongst the Rooks in our woods, and we have seen three of the former hop into a Rook's nest and settle themselves for the night. For an accurate appreciation of the character of the Jackdaw we cannot do better than refer our readers to the 'Ingoldsby Legends,' where, in the description of the atrocities committed by the "Jackdaw of Rheims," they will gather that that incomparable rhymer, the author, had (probably from his long residence in cathedral precincts) become most thoroughly acquainted with the peculiarities of this species. The Jackdaw is a very strong and active flyer; and we have seen some of the best of our trained Falcons entirely beaten by these birds in a fair flight on Salisbury Downs and the heaths and unfenced fields of West Norfolk. We have noticed this species in the summer months in Northern France, Switzerland, Piedmont, Epirus, Andalucia, and Cyprus, as above mentioned. In some parts of European Turkey a race of Jackdaw occurs with a very much lighter-coloured nape than our bird, and has been described as a separate species under the name of *Corvus collaris* (D. Hay).

94. MAGPIE. *Pica caudata.*

This bird still abounds in our county in spite of the constant warfare waged against it by gamekeepers. There are few of our British birds about which so much has been written, or which has been so amply treated of in fact, fancy, and fiction. As the editor of the fourth edition of 'Yarrell's British Birds' remarks, there is no doubt that in former days in England the Magpie was a very familiar species, haunting the neighbourhood of houses, as it still does in many parts of Europe; but since game-preserving and poultry-keeping have become general, it has become absolutely

necessary to keep down the numbers of this beautiful but most mischievous marauder, and the natural caution of the genus *Corvus* has reached its fullest development in the once semi-domestic "Mag." We do not consider, however, that the Magpie is such a determined enemy to the preserver of game as the Jackdaw; and the present species has at least the strong plea of very great beauty in extenuation of its offences, though we fear that, in common with some other animals, it can produce no other "set off." It is true that the Magpie searches the backs of cattle for maggots; but I am assured by an experienced tenant-farmer in our neighbourhood that he considers this remedy worse than the disease, as the Magpies in their search for maggots acquire a taste for beef, and cause hideous sores which are difficult to treat. There are few things that this bird will not devour or carry off for future use or amusement; so it is quite possible that it may occasionally destroy some noxious animals without inflicting harm upon the innocent or valuable; but our experience is that the favourite insect food of the Magpie consists of the grubs of scavenger beetles. We have no fear in this county of exterminating the Magpie so long as our vast ranges of unpreserved wood and fenced pasture-lands exist in their present condition, and furnish secure and suitable nesting-haunts for these pilfering wanderers. Our Magpie, or some very closely allied form, is found almost all over Europe and North Africa; but we never met with it in such abundance anywhere as in the north of Ireland, where we on one occasion counted two hundred and seventy-three of this species in a three hours' journey on an outside car. This bird is also exceedingly common in almost all parts of France, and, indeed is the only species that would appear common to a traveller by railroad through that country who did not keep a sharp and constant look-out from the carriage windows. In Central Spain, in some parts of which the present species is very common, the Spotted Cuckoo *(Coccystes glandarius)* uses the Magpie's nest in the same way as our Cuckoo does those of the Hedge-Sparrow, Wagtail, and other birds in this country; and constant noisy disputes are for ever carried on between the Magpies and the above-named intruders. In many parts of Spain the place of the Common Magpie is occupied by a very beautiful allied species, the Blue-winged Magpie *(Cyanopica cooki)*, peculiar to the Iberian Peninsula; and although extremely abundant, very remarkably local therein, we have never met with these two consorting together, or, indeed, within a short distance of each other. The Magpie, though a wary and cautious bird, is exceedingly inquisitive, and may be called into gunshot-range from a distance by a very feeble imitation of the squeal of a wounded rabbit, or the chatter of a combatant stoat, weasel, or rat, and will also follow a sandy-coloured dog, a fox, or a cat to a great distance. Although the

nest of the Magpie is usually placed at or near the top of a high tree, we are acquainted with many exceptions to this rule; and in Spain have frequently met with nests which could be examined without any climbing, and, still more, whose contents were attainable from horseback. In England this species is generally to be seen in pairs or small parties following a line of fence, and making short excursions of discovery about the pasture-fields; but in Ireland and other countries in which the bird is not persecuted it is not unusually met with in flocks of thirty or forty, which resort to a common roosting-place; and we know of an instance in which upwards of fifty Magpies were shot in a winter's evening by two gamekeepers in a small fir plantation in Ulster. Old nests of the Magpie are much used by other birds as roosting, nesting, and meeting-places; and we have recorded a remarkable case of this nature in this county in the 'Zoologist.'

The nest and eggs of this species are, we presume, too well known to our readers to require description by our pen; but it may be worthy of record that we have met with more than one nest without any dome or covering, in these cases the dense thorn bushes, in the centre of which the birds had built their nurseries, rendering such protection or concealment unnecessary. In confinement, or, more properly speaking, in semi-captivity, the Magpie is a very amusing bird; but his ceaseless chatter is, to our ears, most unmusical and annoying, and his thieving and hiding-instincts have long been historically famous or infamous.

95. JAY. *Garrulus glandarius.*

This beautiful bird is exceedingly common in all parts of Northamptonshire with which we have any acquaintance, and a very great ornament to our woods and plantations. We cannot defend him from a game-preserver's point of view, and he is decidedly detrimental to the gardener; but his actions are so sprightly and lively, his voice capable of such infinite inflections, and his beauty so great, that with us the "Jay bird," as this species is commonly called, is a very great favourite. Shy and cunning as this bird is, his habits may be pretty closely observed at certain times of the year with a little caution and management. Intense curiosity and thirst for knowledge appear to be the principal motives of action: any unusual sight or sound attracts the immediate attention of this species; and the low alarm-note of the Blackbird, the chiding of a Titmouse, or the rapidly repeated "pink, pink," which announces that something has disturbed the mind of the Chaffinch, will soon bring up all the Jays within hearing. If the cause of disturbance should prove to be a dog, cat, stoat, or weasel, the Jays hop about from branch to branch, with harsh and loud cries, as long as

the quadruped remains in the neighbourhood; but should they detect a human presence, they keep quiet in the most leafy spot they can find, and steal off silently to a safe distance on perceiving the slightest movement. In the breeding season the Jay is not often heard and comparatively seldom seen. The nest is generally well concealed, seldom at any considerable height from the ground, a very favourite site being the dense thickets of blackthorn in our forest-district; we have also met with a Jay's nest in a dense young spruce, and often in thick hazel-coppice. The numbers of our native Jays are usually reinforced by an arrival of autumnal visitors during the month of October, but never, in our recollection, to such an extent as in the present year (1882), when, acorns being comparatively scarce, the beech trees in our pleasure grounds at Lilford were visited by more birds of this species than we ever saw there before.

This bird has a wonderful power of imitating the cries of various beasts and birds; and on one occasion near Madrid we spent some time in pursuit of what, from its call, we were convinced was a Common Buzzard, but turned out to be a common Jay, which had acquired the exact note of the former bird. A great destruction of this species takes place on account of the value put upon the blue wing-feathers for making artificial flies for fishing, and every gamekeeper's hand is against the Jay on account of his egg-stealing propensities; but the bird is still abundant in suitable localities throughout England and the Southern counties of Scotland, but in Ireland is by no means so generally distributed and very local. We have met with this species in all parts of Europe which we have visited; it is represented in North Africa and parts of Asia by very similar and closely allied species. In captivity the Jay is a most amusing pet and becomes very tame. There is little trouble in keeping it in good health and condition, as in the matter of food scarcely anything comes amiss. We have found, however, that more than one of these birds in our possession would leave any food for eggs of small birds.

96. SWALLOW. *Hirundo rustica.*

The Swallow is so well known, and its habits so easily observed in town, village, and country, that we have little need to do more than record the fact that it is as common in Northamptonshire as in the other Midland counties of England, its numbers, of course, varying in different summers with us as in other localities. Records of first appearances of our vernal migrants, though locally interesting, are not of any very great value; for, as Professor A. Newton most truly remarks, in his description of the present species (Yarrell's British Birds, 4th edition, vol. ii. p. 341), "It must

be borne in mind that certain spots in nearly every district are yearly visited some days sooner than other places, even in close vicinity." We may, however state that about April 10th is the time to look out for the first Swallow in our neighbourhood: we do not recollect to have ever seen one of this species on wing in Northamptonshire before April 6th: but in 1870 we picked up a dead Swallow on the 2nd of that month. Many curious sites for the nest of the Swallow have been recorded; one of the most remarkable that has come under our own notice was inside the wooden pent-house roofing of an aviary at Lilford, within a very short distance of a perch constantly occupied by a White-tailed Eagle, who appeared to take no notice whatever of the constant passage of the parent Swallows through the wire netting which covered the front part of the cage: in this perilous spot five young Swallows were hatched and reared, and, for all we know to the contrary, may still live to tell the story. We do not recollect to have seen one of this species in Northamptonshire later than the first week of November, though many apparently well-authenticated instances of their tarrying into December in various parts of England have been recorded. As a rule our first broods of Swallows leave the nests about the beginning of July, and as soon as they are strong enough on wing, and able to procure their own food, haunt the banks of the Nen principally, and roost in great numbers amongst the willows and reeds on its banks; the second broods are generally on wing in the first days of September, and about that time the early birds begin to move southward, and may be seen congregating on leafless trees, house-tops, &c., preparatory to departure: by the second week of October the bulk of our Swallows has left us, though there are few seasons in which a late brood or two may not be found in the nest in that month; but our experience is that these very late birds almost invariably die in the nests, or very soon after leaving it. On several occasions when yachting in the Mediterranean at the period of vernal migration we have had many wearied birds of this and many other species come aboard in a breeze of wind; and there is no doubt but that many Swallows annually are drowned, whilst on their travels, in spite of their great powers of flight. The present species is a common summer visitor to all parts of Europe, from Archangel to Gibraltar, and in winter visits the Cape of Good Hope. This species, and indeed all the members of the family *Hirundo*, are of incalculable benefit to man by the destruction of countless myriads of noxious insects; and we cannot sufficiently condemn the abominable cruelty of shooting these beautiful and useful birds for practice or amusement.

97. MARTIN. *Hirundo urbica.*

This pretty little bird is more numerous with us even than the species

last treated of, during the summer months, arriving generally a few days later than the Swallow and soon scattering all over the country. Within a very few days of their arrival these birds set about the work of nest-building; and we have often been amused at their persistent efforts to lay the foundation of their establishments against a wall to which the mud will not adhere. Long rows of nests may be seen under the eaves of the cottages in some of our villages, and not one in others which apparently present exactly the same advantages as those chosen. We have more than once noticed a vast assemblage of Martins on the gravel in front of the house at Lilford, and on investigation found that the birds were devouring minute, black, winged insects which literally covered the gravel, though we could not discover any of them on the turf immediately adjoining; it is remarkable that on one of these occasions certainly there was not a single Swallow to be seen amongst many hundreds of the present species. The Martin generally remains with us a good deal later than the Swallow, in fact it is by no means unusual for a few of the former to linger with us till nearly the end of November. We are inclined to think that the Martin generally lays three successive clutches of eggs; but the young of the third brood are seldom successfully reared, and many unhatched eggs may be generally found on examining a row of Martins' nests in the winter months. This species is a common summer visitor to all parts of Europe; its winter resort appears not to be satisfactorily ascertained.

98. SAND-MARTIN. *Hirundo riparia.*

The Sand-Martin, though by no means rare in our district, is very much less abundant than either of the two species last mentioned, and we are only acquainted with two nesting-localities within a considerable radius from Lilford. This may of course be accounted for by the general character of our soil, which in very few spots admits the mining-operations of this species. These birds are the earliest of the *Hirundines* to arrive in our country, but do not, from our own experience, put in an appearance in our neighbourhood till the Swallow and Martin have been with us for some days. The present species is, except at some of its breeding-stations, seldom to be seen far from water, and certainly seems especially to affect rivers and streams in preference to lakes and ponds. The Sand-Martin may be distinguished from its British congeners when on wing, at a great distance, by its peculiar hesitating manner of flight. We presume that the nesting-habits of this species are known to most of our readers, and will therefore only here state that the favourite localities for a colony of Sand-Martins are the steep sandy banks of rivers, railway-cuttings, chalk and gravel-pits, in

which the birds drive tunnels varying, it is said, from eighteen inches to nine feet in length. Our own experience has been but scanty; but we certainly never met with a nest at more than three feet from the face of the bank, and should, from recollection, reckon the average length of some ten or twelve tunnels which we explored at from twenty to thirty inches. The work of these birds is most interesting to observe, and their rapidity marvellous, when we take into consideration the feeble instruments with which nature has provided them. The nest is composed of dry grass with a profuse lining of feathers, and placed in a slight enlargement at the end of the gallery; the eggs, generally four or five, are pure white, very much resembling, but smaller than, those of the Common Martin. As the editor of the fourth edition of 'Yarrell's British Birds,' most truly remarks, in a footnote, vol. ii. p. 357, "Those who have dug out the nests of this bird need not be reminded of the inconvenience which the operation is likely to produce from the swarms of fleas with which, towards the end of the summer, they are infected;" and fleas are not the only vermin in these abodes. In districts in which the Sand-Martin is common, thousands of these birds collect about the rivers at the end of August, roosting in the trees on the banks, and taking their departure early in September. We have found the Sand-Martin common in suitable spots in every part of Europe which we have visited during the summer months, and before we had visited Gibraltar, were assured that this species was to be found there during the winter; but these supposed Sand-Martins turned out to be Crag or Rock-Martins *(Cotyle rupestris)*, a species which is common in many parts of Europe, and only migrates locally from the interior to the coast during the winter months. Many instances are on record of the Sand-Martin nesting in holes in walls; and we can personally vouch for the accuracy of the case discovered by Messrs. E. Bidwell and H. M. Upcher, as quoted in the fourth edition of 'Yarrell's British Birds,' of these birds selecting heaps of sawdust as their nesting-place.

*(To be continued).*

# THE FLORA OF NORTHAMPTONSHIRE.

*(Continued.)*

By G. C. Druce, F.L.S.

COMPOSITÆ.

657. Onopordium Acanthium, Linn. The Cotton Thistle. Dry waste places. A doubtful native.

Brampton, B, Dallington, Upton Quarries, Blisworth, Nene a; Barnwell, Fotheringhay Castle, Nene c.

This plant still occurs about the earthworks of Fotheringhay Castle, where it may be a relic of the Castle gardens. It is called by the villagers Queen Mary's Thistle.

Although often called the Scotch Thistle this species is not indigenous in Scotland.

658. Silybum Marianum, Gaert. The Milk Thistle. Little more than a garden escape.

Near Brampton, near Kingsthorpe Mill, Nene a; Peterboro', Nene c.

This is another extremely handsome Thistle. The name, Our Lady's Thistle, is derived from the legend that some of the virgin's milk dropped on the plant, and ever since the leaves have been variegated with white. The plant is not indigenous in England, nor does it increase, but in Australia, since its introduction, it has become a perfect pest.

659. Carduus tenuiflorus, Curtis.

Harlestone B, Nene a; Daventry B.

This plant I have not been able to find in Northants.

660. Carduus nutans, L. The Musk Thistle. Native. Dry stoney places.

Harleston, Kingsthorpe, Duston Stonepits, Harpole, Dodford, Blisworth, Nene a; Irthlingboro', Grendon (Miss Brent), Overstone (Miss Birch), Nene b; Peterboro', Nene c; Cosgrove Quarries, Ouse; Barnack and Collyweston, Welland; Daventry B, Avon.

Another very handsome plant, frequent in calcareous districts. Hybrids between this and the following species should be looked for.

661. Carduus crispus, L. Welted Thistle. Hedgerows and waste places. Native and generally distributed.

There are three varieties of this plant, but I have kept no record of their distribution in Northants.

A white variety was found at Yardley Gobion.

662. Carduus lanceolatus, L. The Spear Thistle. Fields and waste places. Native. Common in all the districts.

White flowered varieties of this have been noticed.

663. Carduus eriophorus, L. The Woolly-headed Thistle. Dry calcareous places. Native. Local.

Moulton B, Pitsford B, Holdenby B, Upton B, Harleston Stone Pits, Nene a; Great Billing B, Overstone B, Rushton, Nene b; Sulehay, Bedford Purlieus, Weldon, Geddington Chase (Lewin), King's Cliff (Berkeley), Nene c; Whittlewood Forest, rare, Ouse; Stamford (Jones), Fineshade, Collyweston, Helpstone Heath (Paley), Welland; near Broughton, Cherwell.

A magnificent plant. One specimen seen in Whittlebury Forest measured over 6 feet in height.

664. Carduus palustris, L. Native. Woods and waste places. Generally distributed, though less common than *lanceolatus*, *arvensis*, or *crispus*.

White flowered plants at Foxhall.

The thistle seed forms a favourite food of the Goldfinch and Linnet, which Tennyson evidently has noticed, for he writes—

"As the thistle shakes
When three grey linnets wrangle for the seed."

While the appearance of the seedling plants is as correctly given in—

"Trampling many a prickly star of sprouted
thistle on the broken stones."

Thornbury writes of

"The sunny village lanes
Where the thistle sheds its seed,
And the goldfinch loves to feed
By the milestone green with moss."

666. Carduus pratensis, L. Meadow Thistle. Native. Boggy and marshy fields. Rare, and decreasing.

Holdenby B, probably extinct, Foxhall Bog, Nene a; Overstone B, probably extinct, Nene b; Southorpe (Berkeley), still fairly plentiful, Nene c; Evenley Castle Camp, Cherwell.

The least prickly plant of its genus.

668. Carduus acaulis, L. Native. Dry calcareous fields and road sides.

Boughton, Harleston B, Holdenby, Moulton Park, Badby Downs, Piddington, Blisworth, Gayton, etc., Nene a; Castle Ashby, Yardley

Hastings (Rogers), Overstone (Birch), Geddington, Nene b; Fotheringhay, Nene c; Coppice Moor, Ouse; Collyweston, Barnack, Welland; Ashby Road (Notcutt), Avon.

The variety with lengthened stems has been noticed.

669. Carduus arvensis, Curtis. Native. Everywhere common.

This is the farmer's pest, occurring in arable fields, and increasing in a most rapid manner if land is neglected.

671. Carlina vulgaris, L. Carline Thistle. Native. Dry calcareous ground. Local.

Blisworth border of Plain Woods, Nene a; Embankment in a dry pasture field near Yardley Hastings (Rogers), Geddington Chase, Nene b; King's Cliff (Lewin), Weldon, Southorpe, (Berkeley), Barnack, etc., Nene c. Cosgrove Quarries, Ouse; Fineshade (Lewin), Collyweston Quarries, Welland.

The name is derived from its being the supposed plant with which Charlemagne cured his army of the plague.

*672. Arctium majus, Schkuhr. Native. Road sides and waste places.

Harlestone, Holdenby, Brampton, Ashby St. Ledgers, Rothersthorpe, Nene a; Castle Ashby Woods, Nene b; Peterboro' P, Nene c; Southorpe (Jones), Rockingham, Welland; Greatworth (French), Cherwell; Lilbourne, (Trott), Avon.

A decoction of the plant is said to be useful as an alterative medicine.

The leaves of this plant and the butter bur are the largest of our native plants.

The hooks of the anthodes are singularly formed in order to assist in the dispersion of the fruit.

Shakespeare says—

"They are burs I tell ye; they will stick where they are thrown."

And Tennyson alludes to this plant in—

"A bedmate of the snail and eft and snake
In grass and burdock."

673. Arctium minus, Schkuhr. Native. Road sides and waste places. Generally distributed.

Moulton Park, etc., Nene a; Irthlingboro', etc., Nene c; Wansford, etc., Nene c; Yardley Gobion, Ouse; Stamford, Welland; Banbury F, Cherwell; Yelvertoft, Avon.

677. Serratula tinctoria, L. Native. Woods. Rare and local.

Plain Woods, Piddington (see spec. in Museum herbarium), Boro' Hill and Badby Woods, Maidford (Rogers), Nene a; Grendon Woods (Miss

Brent), Easton Wood (Rogers), Sywell Woods, Weldon (Lewin), Nene b; Bedford Purlieus (Berkeley), Peterboro' (Bodger), Nene c.

Apparently absent from Ouse district.

Daventry Wood (Notcutt), Avon; Little Purston (French and Beesley), Cherwell.

678. Centaurea nigra, L. Black Knapweed. Native. Dry pastures and road sides. Common and generally distributed.

The radiate variety occurs near Blisworth.

679. Centaurea Scabiosa, L. Native. Cornfields and hedge sides. Harlestone, Moulton Park, *var alba* (Sir Jno. Robinson), Harpole, Duston Pits, Hunsbury Hill, Norton. Gayton, etc., Nene a; Overstone (Birch), Irthlingboro', Castle Ashby, etc. (Rogers), Cranford, Nene b; Wansford, etc., Nene c; Yardley, Roade, Stoke Bruerne, Ouse; Culworth, Cherwell.

680. Centaurea Cyanus, L. Corn Blue Bottle. Cornfields. Local.

Kingsthorpe, Moulton Park, Harleston, Blisworth, Newnham (Notcutt), Boro' Hill, Nene a; Peterboro' (Paley), Nene c; Burleigh, Welland.

A very handsome cornfield weed; rare in Northamptonshire, and almost limited to cornfields on sandy soil. There is no record for the Ouse district.

"There is a flower—a lonely flower—
Sown by the wind, raised by a shower,
O'er which love has breathed a powerful spell
The truth of whispering hope to tell;
Now gentle Flora I pray thee tell
If my lover loves me, and loves me well;
So may the face of the morning dew
Keep the sun from fading thy tender blue."

682. Centaurea calcitrapa, L. Dry waste places. Local.

Oundle (Rev. M. J. Berkeley), Peterboro' and Wansford (Morton's Hist.), Nene c.

This plant I have not gathered in the county.

683. Centaurea solstitialis, L. St. Barnaby's Thistle. In lucerne or cornfields. A casual. Rare.

Duston (Rev. Peake Banton), Harleston (Mr. Archer), Dallington Heath.

684. Chrysanthemum segetum, L. Corn Marigold. Cornfields, preferring light sandy soil.

East Haddon, Harpole, Farthingstone, Boro' Hill, Gayton, Danes' Camp, etc., Nene a; Grendon (Miss Brent), Burton Latimer, Irthlingboro', Nene b; Peterborough P, Nene c; apparently absent from Ouse; Easton (Jones), Welland; Culworth, Adstone (Rogers), Cherwell,

Another handsome cornfield weed, and like the foregoing confined to a sandy soil.

685. Chrysanthemum Leucanthemum, L. Ox Eye Daisy. Native. Pastures, road sides, etc. Generally distributed.

A handsome and recently a fashionable wild flower; common in dry pastures. The old Northern name for it was Baldur's brow.

686. Matricaria Parthenium, L. Wild Feverfew. Waste places.

Brampton Bridge, Duston, Nene a; Sewage Works, Nene b; Peterboro' (P), Nene c; Stoke Bruerne Bridge, Ouse; Stamford Warren, Welland; Grimsbury (French), Cherwell.

687. Matricaria inodora, L. Scentless Mayweed. Cornfield, etc.

Wootton, Nene a; Grendon (Miss Brent), Nene b; Wittering, Peterboro' (P), Nene c; Grimsbury (F), Cherwell.

688. M. Chamomilla, L. Wild Chamomile. Fields, etc. Native.

Common and generally distributed.

689. Tanacetum vulgaris, L. Tansy.

Spratton (B), Blisworth Spore Banks, Nene a; Overstone (Birch), Vigo, Yardley Chase, Mears' Ashby (Lewin), Thorpe Malsor (Morton), Nene b; Upton (Morton), Nene c?; Sibbertoft (Morton), Welland.

Once held in high repute as a flavouring herb (tansy pudding being a most fashionable dish), and also used in many medicaments.

690. Anthemis Cotula, L. May Weed. Cornfields, etc. Native.

Foxhall, Boro' Hill (Notcutt), Nene a; Yardley Chase (Miss Brent), Castle Ashby (Rogers), Nene b; Wittering, Nene c; Whittlewood, Ouse.

691. Anthemis arvensis, L. Corn Chamomile. Cornfields. Rare.

Dallington, Cornfields between Newnham and Everdon, rare (Notcutt), Nene a. Mr. Rogers records it as plentiful about Castle Ashby, but I have not seen specimens. Grafton Regis, Ouse.

692. Anthemis nobilis, L. Chamomile.

Only an escape from cultivation in the county, with no pretence to indigenity.

Railway Bank, Northampton.

The uses of Chamomile are too well known to need detailing. It was formerly planted in garden walks that as it was trod upon it might give out its aromatic scent.

> "Though the Chamomile the more it is trodden on, the faster it grows, yet youth, the more it is wasted, the faster it wears."—SHAKESPEARE.

694. Achillea Millefolium, L. The Yarrow. Native. Abundant in all the districts.

Dark red flower at Blisworth.

This is the principal favourite of the local herb women, who put a very exaggerated value on its virtues.

695. Achillea Ptarmica, L. Sneeze Wort. River sides, ditches, etc. Local. Native.

Kingsthorpe B, Brampton, Foxhall, Nene Banks, Nene a; Yardley Chase (Brent), Denford, Irthlingboro', Nene b; Sutton, Peterboro', Nene c; Cosgrove, Ouse; Rockingham (Jones), Welland; Culworth (Rogers), Cherwell.

696. Artemisia Absinthium, L. Worm Wood.

Boughton B, Floore B, Duston Quarries, Nene a; Newton (Lewin), Nene b.

Long known for its medicinal properties; its name is said to have been given by Artemisia, Queen of Caria.

It was generally hung in old houses to drive away insects, as Tusser writes—

"While Wormwood hath seed get a handful or twaine
To save against March to make flea to refrain;
Where chamber is sweeped and Wormwood is strewne
No flea for his life dare abide to be knowne.
What saver is better, if physic be true,
For places infected than Wormwood and Rue;
It is as a comfort for heart and the brain,
And therefore to have it, it is not in vain."

Other composite plants of allied genera are still employed in many countries for the same purpose in keeping away insects.

The French liquor Absinthe owes some of its flavour to the Wormwood, after which it is named.

697. Artemisia vulgaris, L. Mugwort. Dry hedge banks. Native.

Kingsthorpe, Moulton Park, Harpole, Nene a; Weldon, Newton, Irthlingboro', Nene b; Wansford (Jones), Nene c; Roade, Ouse.

This was formerly used instead of hops to flavour beer.

700. Filago germanica, L. Cudweed. Dry fields. Native. Local.

Moulton Park, Boro' Hill (Notcutt), rare, Harlestone, Brampton, Farthingstone, Nene a; Grendon (Miss Brent), Little Houghton (Rogers), Nene b; Thornhaugh, Wansford, Wittering, Nene c; Barnack, Welland.

This again seems absent from Ouse district.

(Filago spathulata and apiculata should be searched for).

703. Filago minima, Fries. Dry sandy places.

Hollowell Heath (Morton's History). This plant I have not seen in the county.

705. Gnaphalium uliginosum, L. Marsh Cudweed. Native.

Dallington, Brampton, Harpole, Daventry Reservoir (Notcutt), Maidford (Rogers), etc., Nene a; Ecton, Mears' Ashby, Grendon, Yardley Chase (Rogers), Nene b; Peterboro', Nene c; Barnack, Welland; Warkworth (French), Culworth, Cherwell; Barby (Trott), Drayton (Notcutt), Avon.

707. Gnaphalium sylvaticum, L. Upright Cudweed. Native. Dry sandy places. Rare and decreasing.

Harlestone B, Naseby Field (Morton), Badby B, Farthingstone, Castle Dykes B, Nene a; Thorpe Malsor (Morton's Hist.), Nene b; Peterboro' (Paley), Nene c; Burleigh Park, Welland.

711. Gnaphalium dioicum, L. Mountain Cudweed. Native, Extremely rare.

Harleston B, extinct, Nene a; Wittering Heath (Morton's Hist., 1878, G. C. D.), Barnack Hills and Hollows (1876, G. C. D.)

The Barnack locality was quoted first in Cole's Adam in Eden, published in 1640.

712. Senecio vulgaris, L. Common Groundsell. Cultivated ground. Native.

Abundant in all the districts.

713. Senecio sylvaticus, L. Heath Groundsell. Dry sandy soil, preferring the neighbourhood of furze bushes.

Harleston B, Boughton B, Dallington, Holdenby B, Farthingstone, Castle Dykes, Danes' Camp, Nene a; Grendon (Miss Brent), Nene b; Daventry Wood (Notcutt), Avon; Kingsutton, Cherwell.

Another absentee from the Ouse district; S. lividus of Baker is probably this.

716. Senecio erucifolius, L. Hoary Ragwort. Road sides and hedge rows, on stiff soil. Native.

Badby B, Blisworth, Boro' Hill, etc., Nene a; Grafton Underwood, Grendon (Brent), Yardley Hastings (Rogers), Nene b; Lilford, Barnwell, etc., Nene c; Grafton Regis, etc., Ouse; Charwelton B, Croughton, Cherwell; Barby B, Avon.

717. Senecio Jacobœa, L. Common Ragwort, St. James' Wort. Native.

Common in all the districts.

## METEOROLOGICAL REPORT, JANUARY, 1883.

THE new year opened gloomily, January following its predecessors of the latter half of last year in being generally dull and wet. A succession of cyclonic storms prevailed with only a few days interval between each, throughout the month, the wind varying from S.W. to N.W., doing an immense amount of damage to property and shipping in all parts of the country, and causing a great loss of life.

In consequence of the heavy rainfall during the month (nearly three-quarters-of-an-inch above the average of the last 14 years) farming has been at a standstill; the valley of the Nene has been more or less under water during the whole of the month.

The temperature has been slightly above the average, some days have been very mild; 54° was registered on the 1st.

Lady Knightley writes that the following flowers were in blossom at Fawsley on the 18th:—"Hepatica, snowdrop, primrose, garden violet, double daisies, aconite, Christmas rose (bees at work in it), pyrus japonica, and heartsease."

## METEOROLOGICAL REPORT, FEBRUARY, 1883.

The stormy and unsettled weather which has prevailed with little intermission during the past few months continued until the 17th, since which date we have had fine bright weather, with northerly winds and very high barometer.

The rainfall for the first 17 days was excessive—registering 3·03 ins. in Northampton—whilst the average fall for the whole month is but 1·86 ins.

The weather has been very mild, and vegetation is in a forward state; whitethorn, in some sheltered spots, had burst into leaf by the end of the month.

Mr. Gregory, writing from Holdenby, says, "on the 14th a pair of starlings commenced building their nests in the garden wall here, and, on the 20th, I found a backbird's nest with four eggs; the bird is sitting."

## METEOROLOGICAL REPORT, MARCH, 1883.

March, 1883, will be remembered as an exceptionally cold month—the mean temperature was much below the average—frost being registered every night, except six, during the whole month. Skating was indulged in by a few persons between the 10th and 12th.

The barometer varied considerably from 30·70 ins., on the 3rd and 4th, to 29·15 ins. on the 26th, corrected to sea level.

Snow fell at intervals, but only to register on four days. A heavy snow storm occurred on the 7th and 8th, with a strong N.E. wind.

The rainfall was below the average, rain and snow falling on ten days only.

F. LAW.

# METEOROLOGICAL OBSERVATIONS, 1883.

## JANUARY, 1883.

| STATION. | OBSERVER. | RAINFALL. | | | | | SHADE TEMPERATURE. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total for Month. | Total for Year. | Greatest Fall. | | Wet Days. | Maximum. | | Minimum. | |
| | | | | In. | Date. | | Deg. | Date. | Deg. | Date. |
| Northampton .. | H. Terry ..... | 2·75 | .. | ·66 | 15 | 22 | 53 | 15 | 27 | 24 |
| " .. | S. Law..... | 2·47 | .. | ·63 | 15 | 19 | 54 | 1 | 28 | 31 |
| Castle Ashby .. | R. G. Scriven..... | 2·36 | .. | ·49 | 15 | 17 | 53 | 1 & 18 | 24 | 31 |
| Weedon ..... | ..... | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 2·68 | .. | ·33 | 29 | 21 | 54 | 1 & 18 | 29 | 31 |
| Rothwell ..... | J. More, M.D..... | 2·56 | .. | ·45 | 15 | 19 | .. | .. | .. | .. |
| Oundle ..... | S. P. Holloway .... | 2·19 | .. | ·41 | 29 | 19 | .. | .. | .. | .. |
| Towcester ..... | J. Webb ..... | 2·96 | .. | ·58 | 15 | 22 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 2·66 | .. | ·60 | 15 | 20 | 50 | 1 | 28 | 31 |
| Fawsley ..... | Lady Knightley.... | 2·73 | .. | ·43 | 29 | 20 | 52 | 1 | 28 | 30 |
| Thorpe Man'ville | Seth Barnes ..... | 2·91 | .. | ·51 | 15 | 21 | .. | .. | .. | .. |
| Holdenby ..... | J. Gregory ..... | 2·93 | .. | ·52 | 15 | 20 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 2·67 | .. | ·43 | 30 | 20 | .. | .. | 23 | 31 |
| Whittlebury .... | W. S. Miller..... | 2·96 | .. | ·56 | 15 | 23 | 52 | 1 | 20 | 30 |
| Haselbeach .... | E. T. Morgan..... | 3·55 | .. | ·64 | 29 | 22 | .. | .. | .. | .. |
| Average 16 years 1866-82 ..... | H. Terry ..... | 2·00 | .. | .. | .. | .. | .. | .. | .. | .. |

## FEBRUARY.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 3·26 | 6·01 | ·63 | 10 | 17 | 50 | 24 | 32 | 5 & 16 |
| " .. | S. Law..... | 3·18 | 5·65 | ·64 | 10 | 15 | 52 | 21 | 26 | 16 |
| Castle Ashby .. | R. G. Scriven..... | 3·04 | 5·40 | ·65 | 10 | 15 | 52 | 21 | 29 | 2 |
| Weedon ..... | F. Capell ..... | 4·26 | 7·34 | ·80 | 10 | 16 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 3·51 | 6·19 | ·73 | 10 | 15 | 55 | 21 & 25 | 30 | 1 & 2 |
| Rothwell ..... | J. More, M.D. .... | 2·83 | 5·39 | ·60 | 10 | 16 | .. | .. | .. | .. |
| Oundle ..... | S. P. Holloway .... | 2·76 | 4·95 | ·55 | 10 | 17 | .. | .. | .. | .. |
| Towcester .... | J. Webb ..... | 4·21 | 7·17 | ·80 | 10 | 16 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 2·18 | 5·84 | ·63 | 10 | 16 | 48 | 22 | 27 | 1 |
| Fawsley ..... | Lady Knightley .. | 3·93 | 6·66 | 1·00 | 10 | 17 | 52 | 21 | 30 | 1 |
| Thorpe Man'ville | Seth Barnes ..... | 4·66 | 7·57 | 1·01 | 10 | 17 | .. | .. | .. | .. |
| Holdenby ..... | J. Gregory ..... | 3·82 | 6·75 | ·87 | 10 | 14 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 2·96 | 5·63 | ·62 | 10 | 14 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller ..... | 4·24 | 7·20 | ·82 | 10 | 18 | 54 | 24 | 26 | 15 |
| Haselbeach .... | E. T. Morgan..... | 3·45 | 7·0 | ·65 | 10 | 16 | .. | .. | .. | .. |
| Average 16 years 1866-82 ..... | H. Terry ..... | 1·90 | 3·88 | .. | .. | .. | .. | .. | .. | .. |

## MARCH.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 1·15 | 7·16 | ·39 | 19 | 10 | 50 | 30 | 19 | 9 |
| " .. | S. Law ..... | 1·12 | 6·76 | ·39 | 19 | 10 | 54 | 30 | 13 | 10 |
| Castle Ashby .. | R. G. Scriven ..... | 1·07 | 6·47 | ·33 | 19 | 11 | 55 | 30 | 17 | 9 |
| Weedon ..... | F. Capell. ..... | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 1·35 | 7·54 | ·35 | 19 | 14 | 55 | 30 | 14 | 10 |
| Rothwell ..... | J. More, M.D..... | 1·44 | 6·83 | ·50 | 8 | 10 | .. | .. | .. | .. |
| Oundle ..... | S. P. Holloway .... | 1·01 | 5·96 | .25 | 19 | 11 | .. | .. | .. | .. |
| Towcester ..... | J. Webb ..... | ·90 | 8·07 | ·23 | 19 | 12 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 1·04 | 5·88 | ·35 | 19 | 10 | 42 | 30 | 18 | 10 |
| Fawsley ..... | Lady Knightley .. | 1·04 | 7·70 | ·35 | 19 | 13 | 52 | 30 | 18 | 23 |
| Thorpe Man'ville | Seth Barnes ..... | 1·42 | 8·99 | ·54 | 19 | 13 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 1·21 | 6·84 | ·29 | 19 | 12 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller ..... | 1·09 | 8·29 | ·38 | 19 | 12 | 53 | 30 | 9 | 9 & 23 |
| Haselbeach .... | E. T. Morgan..... | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Holdenby ..... | J. Gregory ..... | 1·49 | 8·24 | ·40 | 8 | 11 | .. | .. | .. | .. |
| Peterboro' ..... | J. Whitwell ..... | 1·11 | 5·49 | ·25 | 19 | 12 | 55 | 31 | 17 | 9 |
| Average 16 years 1866-82 ..... | H. Terry ..... | 1·53 | 5·42 | .. | .. | .. | .. | .. | .. | .. |

HENRY TERRY, SURGEON.

## THE LIFE HISTORY OF THE LIVER-FLUKE.

*The Life History of the Liver-fluke (Fasciola Hepatica), by A. P. Thomas, M.A., F.L.S.*

*Quarterly Journal of Microscopical Science, January, 1883.*

In the last number of this Journal, p. 197, we noticed some recent Reports of Experiments on the development of the Liver-fluke, by Mr. A. P. Thomas, which had recently appeared in the Journal of the Royal Agricultural Society. These experiments were not at that time complete, but it seemed convenient to call early attention to them, partly on account of the great importance of the subject, from an economic point of view, and partly with the hope of enlisting some assistance in the work among our own members. As however Mr. Thomas has since the publication of these reports succeeded in tracing the Life History of the Liver-fluke to its final stage, and has published a full account of his completed researches in the January number of the *Quarterly Journal of Microscopical Science*, it will not be amiss to add here the few facts which have been elicited.

We have already seen that the embryo of the fluke after being hatched from the egg swam freely through the water until it met with a *Limnæus truncatulus*, when it bored its way into the body of the snail, and became a sporocyst. Then from this sporocyst were produced a second generation of embryos of different form, which separated themselves from the sporocyst, but still in the body of the snail, as free rediæ, and these rediæ again became the parents of a third generation. Lastly, in a snail dissected in the seventh week after infection Mr. Thomas found rediæ containing cercariæ, which however were not quite mature. Whether these cercariæ passed out of the snail, or were eaten with it by the sheep, was then uncertain.

It is not necessary for us to deal with the first part of Mr. Thomas' paper now under notice, as it merely goes over the ground of the former papers which we have already reviewed, but we will pass on at once to the development of the cercariæ. These are visible at first merely as rounded masses of cells, but as they increase in size they assume a more elongated shape, whilst one end becomes more attenuated than the other. The more slender end becomes slightly constricted off to form the rudiments of the tail, which as yet is very stumpy. Of these cercariæ an adult redia will contain about a score, among which several will be approaching complete

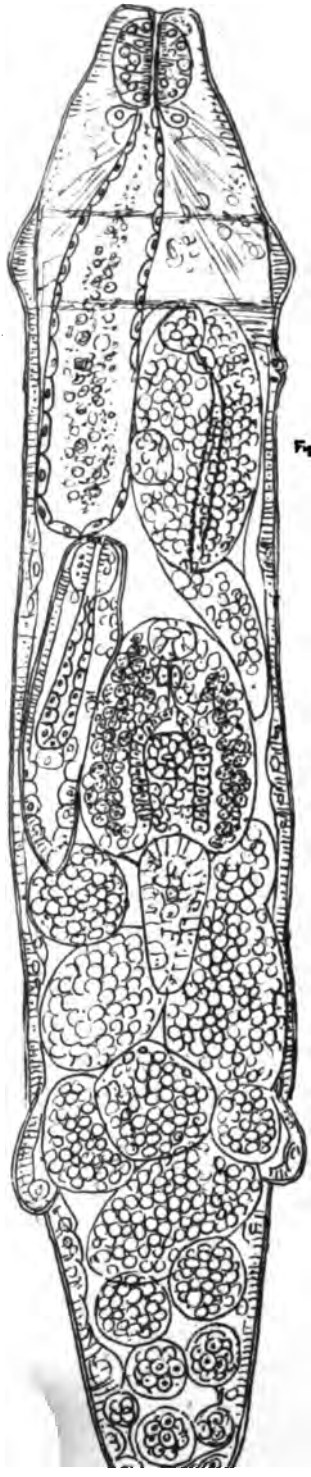


Fig. 1

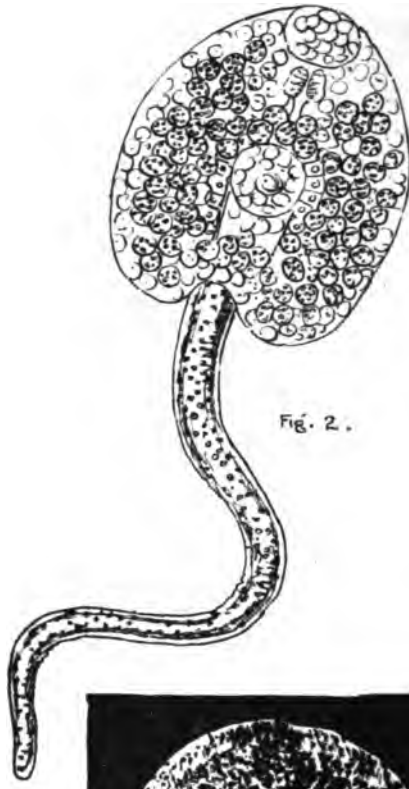


Fig. 2.

development. Their appearance is represented in the accompanying plate (Fig 1). The cercariæ on reaching their limit of development escape from their parent redia, and then by the aid of suckers and tail crawl or wriggle their way out of the snail. At this stage they may sometimes be found swimming in the water of an aquarium in which infected snails are kept (Fig. 2), as the granular cystogenous cells which render the body nearly opaque under the microscope give it a snow-white appearance by reflected light, and they are therefore conspicuous for their size.

Mr. Thomas says, however, that their life as free swimming animals

"never seems to last long, for on coming in contact with the sides of the aquarium or the water plants contained in it, the cercaria proceeds to encyst itself. Numbers of minute snow-white cysts may thus be seen adhering to the walls of the aquarium, or to the dark green leaves of the water plants. The way in which the cyst is formed can be readily observed under the microscope, for when examined on a glass slide, the cercaria soon comes to rest, and assumes a rounded form, whilst a mucous substance is poured forth all over the body, together with the granules forming the contents of the cystogenous cells already mentioned. The tail is sometimes shaken off before the encystation begins, but, as a rule, the tail remains in connection with the body during the process, and continues to be energetically lashed from side to side, until finally a more vigorous movement detaches it. The whole process of forming the cyst is very rapid, and in a few minutes a layer of considerable thickness is formed, while its substance begins to harden. The cysts, as already remarked, are snowy-white, but the body of the included Fasciola is quite transparent."

Fig. 3 represents a cercaria engaged in forming its cyst.

Mr. Thomas' paper concludes with a sketch of the habits of the *Limnæus Trunculatus*. This snail, he says, should be termed amphibious, and indeed is oftener found out of the water than in it. When kept in an aquarium it quits the water, and as often as it is put back crawls forth again so long as the necessary strength remains. It has been known to exist a long time away from water among the roots of grass, etc. Mr. Thomas placed some of them for experiment in an open vessel on a shelf in a dry laboratory, and found that more than 50 per cent. revived after twenty-six days of this treatment, and some few revived after more than six weeks. He concludes as follows:—

"It is clear, therefore, that the species of snail under consideration, when left on the fields by the passing away of a flood, continues to wander and feed so long as the bottom of the grass remains moist. It is equally clear that the numbers so left are recruited from surrounding ditches and streams. A drought may render the snail dormant, but, unless too long continued, it revives at the first shower of rain. If there are fluke-eggs on the ground and water in puddles or ditches for them to develop in, the *L. trunculatus* will most certainly be infected with the larval forms of the Liver-fluke; and, owing to the habit this particular snail has of living so much out of the water, either on the banks of ditches or further away towards the centre of the fields, if they are damp enough, the cercariæ will, on leaving their host, encyst

on the grass in the places where they have the best chance of being transferred to the herbivorous mammals grazing on the ground. Having thus gained a suitable home they will attain the mature sexual condition, and reproduce their species by means of ova, thus completing the developmental cycle."

Having thus concluded what is necessarily from our limited space only a hasty sketch of the Life History of the Liver-fluke, as detailed in the most interesting and valuable papers by Mr. A. P. Thomas above noticed, it only remains to recommend those of our readers who are interested in the subject to have recourse to the papers themselves, which are a most important contribution to our knowledge of certain low phases of life which have not hitherto been well understood. We would also ask our members who may be taking excursions in the Nene valley this summer to pay particular attention to the habits of *L. trunculatus*, which little creature has now acquired an importance far greater than its diminutive size and retiring habits would seem to denote. Those who wish for an account of the economic aspects of the subject, including the discussion of preventive measures, may be referred to a paper by Mr. Thomas dealing with those questions in the forthcoming number of the "Journal of the Royal Agricultural Society," which we hope may be reprinted as a pamphlet and widely distributed.

R. G. S.

# NOTES ON LOCAL GEOLOGY.

## *Part X.*

### The Junction Beds of the Middle and Upper Lias.

After the formation of the *Rock-bed* of the Middle Lias (described in the last paper), and before the deposition of the Upper Lias, there seems to have been a short interval of time during which little or no deposit took place in the area which is now the Midland district of England, whilst an Upper Lias fauna was developing outside it. The following hypothesis will probably best explain all the phenomena observed :—At the close of the period during which the *Rock-bed* of the Middle Lias was being deposited, a general uplifting of the district which is now England took place, that had the effect of raising some part of the Middle Lias above the water, whilst it left a larger portion with a comparatively shallow layer of water over it, in the condition of a quiet lagoon, partially or entirely cut off from the deep sea of the period in which an Upper Lias fauna was developing. A third portion of the Rock-bed being at the same time open to the sea received the deposits known as the "*paper shales.*" After a short interval of time—geologically speaking—a general depression of the English area took place, and this made the whole district now covered by the Upper Lias a part of the neighbouring deep seas.

A theory such as I have described above will require for its support evidence on the following points :—It will be necessary to show that the Upper and Middle Lias are conformable one to the other ; that some parts of the *Rock-bed* suffered erosion, whilst others received a thin deposit giving indications of shallow water ; and that there was a mingling of Middle and Upper Lias fossils at the junction of the two formations with a preponderance of Middle Lias forms. This is just the nature of the evidence that I think this paper will furnish.

That the various members of the Lias—Lower, Middle, and Upper—are conformable one with the other is generally admitted ; there is no great or sudden break in the succession of life at any part of the series. Professor Ramsay in his "Physical Geology and Geography of Great Britain," page 172, says—"Nothing is more clear to me than that there was no break in time between the successive conventional divisions of the Lower, Middle, and Upper Lias. Each in ascending succession lies quite conformably on the other ; between the Lower and Middle divisions there is a clear lithological passage, accompanied by passage of species, and though there is generally a very sudden break in lithological character between the Marlstone and the

Upper Lias clay or shale (due perhaps to rapid depression of area), yet contrary to a not unprevalent belief, there is a greater number of species common to these divisions than is generally imagined."

From the lithological characters of the upper part of the Middle Lias *(ferruginous limestones, and sandy clays containing concretionary ferruginous nodules)*, as well as from the fossil contents of the upper bed, I think there was a shallowing of the seas taking place in this district before the close of the Middle Lias period from actual elevation of the sea bed. The sandy nature of the beds, the large amount of iron often found in the *Rock-bed*, and the frequent occurrence of *wood* in the same, may, I think, be taken as indications of the nearness of recently-formed land, because there are no beds so ferruginous below, nor, so far as I am aware, is wood found in the beds below the *Rock-bed*. This gradual elevation continued probably till some part of the *Rock-bed* protruded from the water, and suffered the erosion which it exhibits in a few places; other portions meanwhile remained still under water, and received the shallow water deposits which I wish particularly to speak about in this paper.

Professor Judd in his "Geology of Rutland," page 65, observes that—"When the junction of the Upper Lias with the Marlstone Rock-bed is seen, the latter often presents the appearance of having suffered erosion before the deposition of the latter," and also "Taking into account all the characters presented by the Marlstone Rock-bed, and remembering the evidence of shallow water conditions which the beds immediately lying upon it exhibit, it seems probable that an interval occurred between the deposition of the Marlstone and the Upper Lias; but when we remember the fact of the passage of certain species from one to the other, especially of the Planulate Ammonites, it is clear that this interval was not one of long duration."

Mr. Walford ("On some Middle and Upper Lias Beds in the neighbourhood of Banbury"), says—"The shelly band at the top of the Rock-bed, at ASTON-LE-WALL in particular, is made up chiefly of broken and rolled Belemnites, separated valves of Rhynchonellas, and detached Pentacrinite joints, suggesting an interval of cessation in deposition of sedimentary matter prior to the formation of the next layer. One fragment I have of the Rock-bed shows an eroded surface in the hollows of which are numbers of valves of *Astarte striato-sulcata* (Romer), for the most part in an upright position, and so packed as to suggest the necessity of a strong current to place them so. The Transition bed, generally, at ASTON, presents evidences of littoral conditions in the worn and fragmentary character of many of the shells."

I have myself seen the section at ASTON-LE-WALL, but did not notice all the characters described above, nevertheless I have no doubt of the correctness of the description given by Mr. Walford, and I have equal faith in his interpretation of it.

The shallow water conditions of the period, and general transitional nature of the junction beds of the Middle and Upper Lias receive peculiar confirmation by the study of a thin bed of marl, or marly limestone and clay, existing just above the Rock-bed almost everywhere in this county. This bed has been named by Mr. Walford the *Transition bed*, and by that name I shall speak of it in this paper. In Northamptonshire the Transition bed is very persistent. I have found it possessing the same characters, litho-logical and palæontological, over a considerable area. The greatest thickness recorded by Mr. Walford is *6 inches*, at CHIPPING WARDEN, but it appears to thicken gradually to the E. and N., because near to MILTON, and about 3 miles from NORTHAMPTON, it has a thickness of about *14 inches*. Professor Judd, too, describes a section at ROBIN-A-TIPTOES, in which "between the Upper Lias clay and the Marlstone Rock-bed there occur *2 feet* of a laminated ferruginous sandy and marly clay, forming a gradation from the Upper Lias clay to the Middle Lias Rock-bed." Further, a bed identical with the *Transition bed* in position, and similar in some of its characters, in YORKSHIRE, average *30 feet* in thickness.

Messrs. Tate & Blake ("Yorkshire Lias") have placed a set of beds between the "*spinatus*" zone of the Middle Lias and the Upper Lias, which they have named the *Zone of Ammonites annulatus*, on account of the prevalence of that cephalopod in it. The thickness of the zone averages 30 feet, and the fossils, which are most abundant in the lower part of it, are chiefly Middle Lias ones, although the characteristic ammonite, *A. annulatus* is an Upper Lias one. Relying almost entirely upon palæontological evidence they have placed this set of beds at the top of the Middle Lias. The fossils are in most cases of small size, and in an imperfect state of preservation. On the whole this set of beds appears rather to be a transition series from the Middle to the Upper Lias, in which the conditions favoured more the continuance of Middle Lias forms than the introduction of Upper Lias ones. As I shall not have to refer to these beds again, as they exist in Yorkshire, I may now say that they are grey shales, and that although the fossils are mostly small, the Upper Lias ammonite *A. communis*, is well developed.*

THE TRANSITION BED of Northamptonshire is usually a rather thin band of grey, friable, sandy marl, passing upwards into a reddish sandy

* Tate & Blake "The Yorkshire Lias."

clay. The lower part is very fossiliferous, and seems to be made up chiefly of rounded calcareous grains; it effervesces briskly with acids, and weathers reddish brown on exposure. Sometimes it passes into a compact and hard limestone, but even then, apart from the fossils it contains, it is easily identified.

At CHIPPING WARDEN the *Transition bed* is divided into two by a thin band of ferruginous limestone similar to the Rock-bed. (See section page 244). From the broken character of the fossils in this bed I should think it was formed of the materials arising from the denudation of some part of the Rock-bed near at hand, possibly from the part of the Rock-bed near ASTON-LE-WALL, which shows evidence of erosion (See page 240).

Mr. Walford gives as the limits of the district in which he has found this bed :—ADDERBURY, 3½ miles S. of Banbury; THENFORD, 3½ miles E. of Banbury; and STIRCH, about 11 miles N. of Banbury. I have been fortunate enough to discover the same bed, possessing the same characteristics, as far northwards as CATESBY, and also in the neighbourhood of NORTHAMPTON, which is about 22 miles to the N.E. of Banbury. The extension of it still further northwards is pretty evident too from the quotations made from Messrs. Tate & Blake's "Yorkshire Lias," and Prof. Judd's "Geology of Rutland." Considering how thin this bed is in Northamptonshire, and how persistent it is, I think we must conclude that it was deposited on a very level surface. Comparatively slight inequalities would have destroyed the continuity of such a thin bed, but I have nowhere found it absent where it might be expected to be present.

Of the fossils of this bed I intend to say very little, because, at my request, Mr. E. A. Walford, F.G.S., has very kindly consented to write a paper for our next Journal on the Palæontology of the *Transition bed*.

The lower part of the bed, that is the marl, abounds in fossils of many different genera and species, and everywhere in it *Ammonites acutus* (Tate) is abundant. On examining the bed anywhere though, one cannot help being struck with the abundance of *gasteropods;* they must have swarmed in the shallow inland seas of this period. Most of the fossils of the "*spinatus*" zone are found in this bed—*Rhynchonellæ*, *Terebratulæ*, *Ammonites*, and *Belemnites*, &c., but they are all small, as though the conditions were unsuitable to their proper development. Serpulæ are rather abundant and of large size. The abundance of the fossils, and the nature of them—*Plicatulas*, *Ostreas*, *Gasteropods*, &c., together with the decline in numbers and size of deep sea forms, seem to indicate a warm, shallow, inland sea.

I think it probable that some parts of this inland sea communicated with the deeper seas where the Upper Lias was developing, because Upper Lias fossils are found mixed with the Middle Lias ones in this bed, though the mixing is almost entirely confined to Upper Lias Ammonites with miscellaneous Middle Lias fossils, except in the case of those fossils which range through both formations. In Northamptonshire the particular Upper Lias Ammonite found most abundantly in this bed is *A. Holandrei*, but I have found also *A. annulatus*, *A. fonticulus*, and *A. communis*. In Yorkshire, and some other places, *A. communis* is the most abundant ammonite. With respect to the characteristic ammonite of the Transition bed, named *Ammonites acutus* by Tate, I may say that since I commenced writing this paper I have carefully examined some twenty or thirty specimens, and have come to the conclusion that it must be regarded as an Upper Lias one; a member of the falcifer group. I have come to this conclusion, because, although the ammonite at first sight appears smooth, in most cases striations can be seen on careful inspection, and these are more prominent the larger the specimen, until a point is reached in which it would certainly be called by another name if found anywhere else. I have a few imperfect specimens of *A. acutus* which shew the internal structure of this cephalopod, and they strongly confirm the view I have taken of this question. The ammonite seems to have transitional characters as marked as the bed in which it is almost exclusively found.

The characters of the Transition bed may be studied in a few places of which sections have already been given in these papers, viz. :—MIDDLETON CHENEY, THENFORD, CATESBY, and STIRCH; and below I give a few others.

A very good section is to be seen about a mile from Chipping Warden towards Byfield—Wilson's pit I think it is called.

SECTION NEAR TO CHIPPING WARDEN.

| | | ft. | in. |
|---|---|---|---|
| | 1. Soil ... .. ... ... ... ... ... ... | 1 | 0 |
| Upper Lias. | 2. Light grey clay containing small *Ammonites* and *Belemnites*, also irregular blocks of white limestone in the upper part, the remains of the *Cephalopoda bed* | 2 | 2 |
| | 3. Limestone in two bands, some of it violet coloured inside. Upper part in small irregular pieces easily broken, lower part larger blocks, harder, and look as though water worn in places. (*Fish bed*) containing | 0 | 3½ |

*Ammonites scrpentinus ?*
*Ammonites Holandrei ?*
*Ammonites acutus.*
*Belemnites.*
*Pectens.* *One small bivalve.*

Middle Lias.

4. *Transition bed.* Clay, and grey friable sandy marl, very red in places. The marl much more fossilferous than the clay, containing— ... ... ... ... ... — ft. 0 in. 6

*Ammonites acutus.*
*Ammonites communis?*
*Ammonites Holandrei.*
*Belemnites.*
*Pectens.*
*Ostrea.*
*Plicatula spinosa.*
*Astarte subtetragona.*
*Astarte striato-sulcata.*
*Leda Galatea.*
*Chemnitzia foveolata.*
*Phasianella morencyana? or Buvignieri?*
*Actæonina Ilminsterensis.*
*Trochus sp.?*
*Eucyclus sp.?*
*Cryptænia consobrina.*
*Pleurotomaria sp.?*
*Eucyclus conspersus.*
*Rhynchonella tetrahedra (small but plentiful).*
*Terebratula cornuta?*
*Diastopora liassica?*
*Serpulæ.*

*Small Ironstone concretions, and crystallized Carbonate of lime in the lower part.*

5. Ferruginous limestone, similar to Rock-bed. Lower part very fossilferous.—Broken shells chiefly. ... — 0 in. 3

*Large Belemnites.*
*Pecten liasinus.*
*Pecten æquivalvis.*
*Pentacrinite stems.*
*Rhynchonella tetrahedra var. Northamptonensis.*

6. Sandy marl, very much like Transition bed. Larger Rhynchonellæ than in No. 4, many as separated valves. Many crushed specimens and broken shells... — 0 in. 3

*Gasteropods.*
*Encrinite stems.*
*Rhynchonellæ.*
*Bivalves.*

7. Rock-bed. A ferruginous limestone; very red exterior. Usual fossils.

Not far from the before-mentioned is another section in which the Transition bed is well developed.

THE RECTORY PIT, ASTON-LE-WALL, *near to Appletree.*

| | | ft. | in |
|---|---|---|---|
| 1. | Soil... ... ... ... ... ... ... ... ... 1ft. to | 1 | 6 |
| 2. | Greyish clay, with remains of *Cephalopoda bed* ... ... ... | 1 | 7 |
| 3. | *Fish-bed*, a whitish limestone, with violet interior, containing *Ammonites.* *Belemnites.* *&c.* | 0 | 6 |
| 4. | Marly limestone, passing into No. 3, hard, but easily recognized as the *Transition bed*, containing— *Ammonites acutus.* *Plicatula spinosa.* *Chemnitzia foveolata.* *Actæonina Ilminsterensis.* *Trochus sp.?* *Encrinite stems.* *&c., &c.* | | |
| 5. | Marl or clay. In places this is absent and its place entirely taken up by hard stone of the Transition bed ... ... | 0 | 1 |
| 6. | Marlstone Rock-bed. Top part crowded with broken *Rhynchonellæ*, *Belemnites*, and *Pentacrinite joints* ... *about* | 6 | 0 |

About a hundred yards from the above, just opposite the houses at APPLETREE, is a small section almost identical with the last. The grey clay, No. 2, being a little thinner.

On the East and West Junction Railway, rather less than a mile W. of Byfield Station, near to the bridge, the Transition bed can be well examined.

SECTION NEAR TO BYFIELD.

1. Soil.
2. Fish bed.
3. Transition bed, containing— .. ... 0ft. 2in.
   *Ammonites acutus.*
   ,, *Holandrei.*
   ,, *communis.*
   ,, *fonticulus.*
   ,, *spinatus (small one)*
   *Astarte subtetragona.*
   *Astarte striato-sulcata.*

*Plicatula spinosa.*
*Actæonina Ilministerensis.*
*Cryptænia consobrina.*
*Chemnitzia semitecta?*
*Chemnitzia foveolata.*
*Trochus sp.?*
*Rhynchonella tetrahedra.*
*Terebratula.* &c., &c.

4. Rock bed ... ... ... ... 6 feet or more.

By the side of the brook, in the valley near to Warden Grange, and about a third of a mile from Mawbey's clay pit, is a section of the Marlstone which has not been worked for a considerable time.

SECTION NEAR TO WARDEN GRANGE.

| | | ft. | in. |
|---|---|---|---|
| 1. | Soil with blocks of limestone... ... ... ... ... ... | 1 | 3 |
| 2. | Grey, marly clay, light coloured, with *Ammonites* and *Belemnites* | 2 | 9 |
| 3. | Hard white limestone, purple interior *(Fish bed)* ... ... *Ammonites (abundant).* *Fucoid markings.* | 0 | 4 |
| 4. | Reddish sandy clay, soft, and passing into grey marl; the usual form of the *Transition bed.* The lower part of the Transition bed is hard. The upper part of the clay contained some badly preserved fossils of a similar kind to those found in the marl.. | 0 | 7 |
| 5. | Rock bed. | | |

There is an interesting section in which the Transition bed is well developed about three miles from Northampton, near to Milton. The section I shall give in connection with the Upper Lias, but the fossils obtained from the Transition bed are mentioned below.

FOSSILS FROM THE TRANSITION BED AT MILTON.

*Ammonites acutus.*
*Ammonites Holandrei.*
*Ammonites communis.*
*Lima punctata.*
*Cucullæa Munsteri.*
*Astarte striato-sulcata*
*Eucyclus concinnus? or Œmilius?*
*Rhynchonella tetrahedra.*
*Waldheimia resupinata?*
*Serpula tetragona.*

B. THOMPSON.

# A SYSTEMATIC CLASSIFICATION OF THE LEPIDOPTERA WHICH HAVE OCCURRED IN THE VICINITY OF NORTHAMPTON.

By Wm. Hull and H. F. Tomalin.

## Genus XIV.—Miana (Steph.)

*Species* 1...*M. Minima* (Haw.) ...*Least Minor*
Locality..Wellingborough.

„ 2... „ *Strigilis* (Linn.) ...*Marbled Minor*

(*Var*) *Æthiops* (Haw.) ...*Blackamoor*

„ 3... „ *Fasciuncula* (Haw.) ...*Middle-barred Minor*

## Genus XV.—Euplexia (Steph.)

„ 1...*E. Lucipara* (Linn.) ...*Small Angle Shades*
Locality..Northampton.

## Genus XVI.—Habryntis (Led.)

„ 1...*H. Meticulosa* (Linn.) ...*Angle Shades*

## Genus XVII.—Mormo (Steph.)

„ 1 ..*M. Maura* (Linn.) ...*Old Lady*

## Genus XVIII.—Nænia (Steph.)

„ 1...*N. Typica* (Linn.) ...*Gothic*

## Family X.—Xylinidæ.

## Genus I.—Calocampa* (Steph.)

„ 1...*C. Vetusta* (Hübn.) ...*Red Sword-grass*
Locality..Whittlebury Forest.

„ 2... „ *Exoleta* (Linn.) ...*Sword-grass*
Locality..Whittlebury Forest.

## Family XI.—Cleophanidæ.

## Genus I.—Xylocampa (Guén.)

„ 1...*X. Lithorhiza* (Bork.) ...*Early Grey*

## Family XII.—Cucullidæ.

## Genus I.—Cucullia (Shrank.)

„ 1...*C. Verbasci* (Linn.) ...*Mullein*
Locality..Harlestone, Hardwick, Whittlebury Forest.

„ 2... „ *Umbratica* (Linn.) ...*Shark*
Locality..Whittlebury Forest, Northampton.

„ 3... „ *Chamomillæ* (Wien Verz.) ...*Chamomile Shark*
Locality..Whittlebury Forest.

„ 4... „ *Absinthii* (Linn.) ...*Wormwood Shark*
Locality..Whittlebury Forest.

* Calocampa signifying beautiful caterpillars.

FAMILY XIII.—ANARTIDÆ.

GENUS I.—HELIACA (Herr—Schäff.)

*Species* 1...*H. Arbuti* (Fabr.) ...*Small Yellow Underwing*

GENUS II.—ANARTA (Tr.)

,, 1...*A. Myrtilli* (Linn.) .. *Beautiful Yellow Underwing*
Locality..Yardley Chase.

SECTION II.—QUADRIFIDÆ.

VARIEGATÆ.

FAMILY IV.—PLUSIDÆ.

GENUS I.—HABROSTOLA (Hübn.)

,, 1...*H. Triplasia* (Linn.) ...*Dark Spectacle*
,, 2...,, *Urticæ* (Hübn.) ...*Light* ,,

GENUS II.—PLUSIA (Ochs.)

,, 1...*P. Chrysitis* (Linn.) ...*Burnished Brass*
,, 2...,, *Iota* ,, ...*Golden Y.*
Locality..Hardwick.
,, 3...,, *Gamma* (Linn.) ...*Silver Y.*
,, 4...,, *Interrogationis* ,, ...*Scarce Silver Y.*

LIMBATÆ.

FAMILY XV.—OPHIUSIDÆ.

GENUS I.—CATOCALA (Shrank.)

,, 1...*C. Nupta* (Linn.) ...*Red Underwing*
Locality..Wellingborough, Northampton.

SERPENTINÆ.

FAMILY XVI.—EUCLIDIDÆ.

GENUS I.—EUCLIDIA (Ochs.)

,, 1...*E. Mi* (Linn.) ...*Mother Shipton*
,, 2...,, *Glyphica* ,, ...*Burnet Noctua*

## MEETINGS OF THE SOCIETY.

### JANUARY, 1883.

MEETINGS of the various sections were held on Tuesday, the 9th, and Tuesday, the 23rd, also a general meeting on the 25th, when Messrs. E. W. Howe, E. G. Fuller, and W. Ball were elected members. Mr. C. E. Crick read a paper on "Mosses," minutely describing their mode of growth and reproduction. A number of specimens of mosses were exhibited by Mr. J. Gregory, Mr. R. Rogers, Mr. Crick, &c. Mr. R. G. Scriven then described the "Life History of the Liver-fluke" (this paper has subsequently appeared in our Journal). The lecture was illustrated by diagrams of the liver-fluke in its various stages.

### FEBRUARY.

At the sectional meeting on the 6th, the following were elected as members:—Messrs. W. H. Turner, A. K. Fowkes, and Alex. Forbes.

Mr. H. Eunson made some remarks upon the Gayton boring, Mr. F. Law read his meteorological reports, and Mr. S. J. Newman briefly described how the geology of countries has in many ways influenced their methods of building, more especially in the early times when materials were not so readily transported as in these days.

At a meeting on the 20th a paper by Mr. Rogers was read, upon "The Quadrupeds of Yardley Chase"—the fox, fallow-deer, badger, polecat, stoat, weasel, hedgehog, mole, squirrel, dormouse, shrewmouse, &c.

Messrs. Kempson, Durham, and West also exhibited specimens. Mr. S. J. Newman then made some remarks upon the discovery of a stone coffin—a few days previously—at Kingsthorpe, close by the rear of Lady Robinson's house, on the site of the old Hospital of S. David or Holy Trinity. A skeleton was found in the coffin wrapped in a coarse garment similar to sack-cloth, and in this wrapping were innumerable dry pupa cases of some species of fly.

The annual meeting was held in the Council Chamber, Guildhall, on the 27th—the Rev. S. J. W. Sanders in the chair. Mrs. Camp was elected a member. Mr. S. J. Newman (Hon. Sec.) presented and read the report for the year (which will appear in due course). The adoption of the report was moved by the Rev. F. H. Wood, M.A., seconded by Mr. C. E. Crick, and carried unanimously. The Chairman proposed that Mr. Newman be requested to arrange for obtaining the Gilchrist lectures for the next winter, which was carried. Mr. Newman proceeded to read some supplementary notes in connection with the report, giving numerous details of the

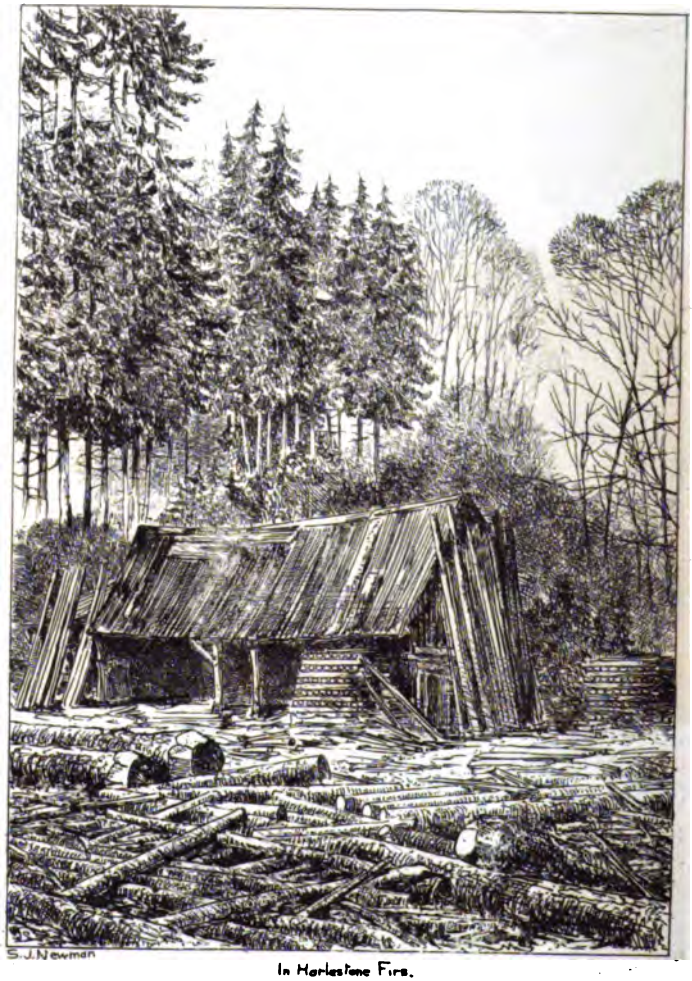
Natural History Societies throughout the country, and the work undertaken by them, with suggestions for more connected research, under the guidance of the "Local Scientific Societies" Committee of the British Association, aided perhaps by subsidiary unions such as the "Midland Union" and the "Yorkshire Naturalists' Union." Details were given of the work done by many societies in preparing careful descriptive lists of species, more especially noticing the Norfolk and Norwich, Croydon, Epping Forest, Rugby, Chester, Hereford, and Bedfordshire societies. Particulars were also given of some societies' libraries and museums—the latter, however, being in some cases more curious than useful. A vote of thanks to Mr. T. Bailey was then passed unanimously in recognition of his services to the Society as Treasurer from the commencement, and regret was expressed at his enforced withdrawal. Several alterations in the Bye-Laws, of which proper notice had been given, were ratified, and the officers for the year elected.

## MARCH.

At the sectional meeting held on the 6th Mr. W. D. Crick showed specimens of Limnæus trunculatus, and mentioned the petrifying qualities of a brook by the Kettering road, showing shells taken from it coated with carbonate of lime. Messrs. Elkington and Holding also contributed specimens. Mr. S. J. Newman described a species of Coccus, very commonly found in S. Michael oranges, showing also a diagram of the wax-like covering with the eggs clustered beneath, and specimens were shown in the microscope.

A general meeting was held in the Council Chamber on the 15th. A. Kempson, Esq., in the chair. Mr. T. J. George, F.G.S., was elected a member. Mr. S. J. Newman then read a paper upon the subject of "Man's agency in extending some species and exterminating others," of which a short abstract may appear in the next Journal. Mr. Beeby Thompson, F.G.S., described the work of the Ordnance Survey, especially the methods of producing the maps at the Southampton office by Zincography, &c. Mr. S. J. Newman then briefly described—with the aid of diagrams—the method of measuring the Misterton Carr base line, and showed geological sections of Snowdon, &c.

A sectional meeting was held on Tuesday, the 20th, when Messrs. R. Phipps and W. D. Loveday were elected members. A large number of Microscopical objects were shown by Messrs. A. Kempson, J. Gregory, G. Osborne, C. E. Crick, and W. D. Crick.




In Harlestone Firs.

# MIDLAND UNION OF NATURAL HISTORY SOCIETIES.

## TAMWORTH MEETING, JUNE 12TH AND 13TH, 1883.

Reprinted from the "MIDLAND NATURALIST," July, 1883.

The Sixth Annual Meeting of the Union was held at Tamworth during the second week in June, a date which seems now to be finally recognised as suitable for an engagement combining indoor [illegible] excursion.

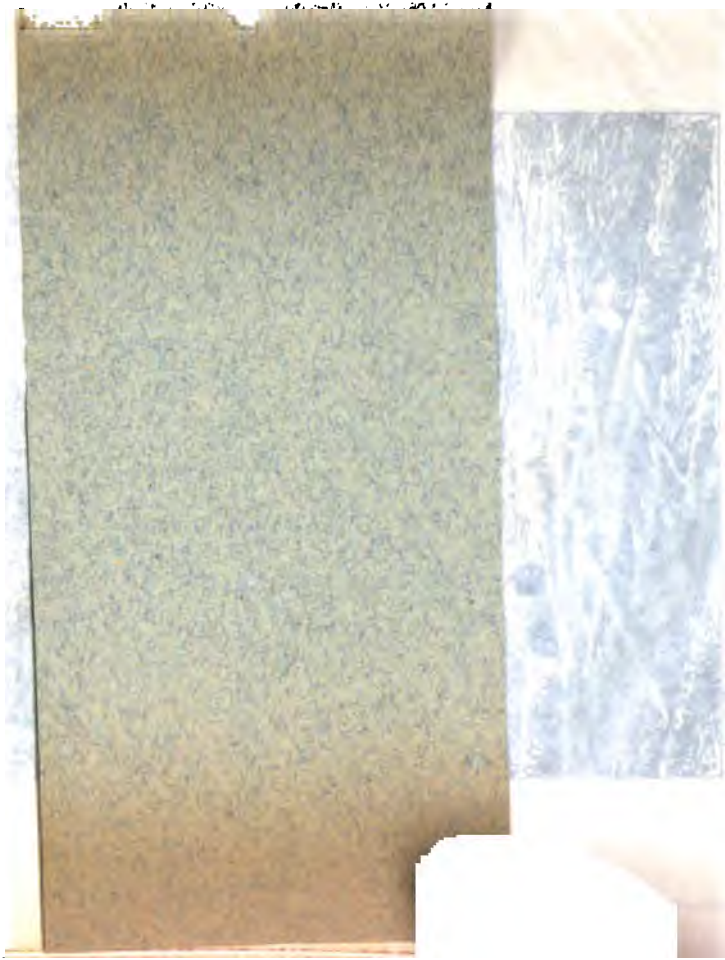
[illegible] by the kind permission of Thomas

[illegible] that since the photograph of the Wolsey Elm was taken, an accident has happened to the negative, which renders it impossible to give the photograph in this number to our members. An effort will be made to get another negative taken in time for the next number. Mr. S. J. Newman (our Hon. Sec.) has kindly come to the rescue and gives us a copper etching of a scene in Harlestone [illegible].

THE EDITORS.

J. Rabone, J. Tusley, [illegible] B.Sc. (Birmingham), C. Cochrane and H. Pearce, F.L.S. (Stourbridge), S. J. Newman and B. Thompson, F.G.S., F.C.S. (Northampton), F. E. Lott (Burton), F. T. Mott, F.R.G.S. (Leicester), A. Stephenson, M.D. (Nottingham), W. Mathews, C.E. and E. Wheeler, C.E. (Peterborough), Dr. F. W. Crick (Bedford), W. Madeley (Dudley), B. Sturges Dodd W. Watchorne and T. Goldsmith (Nottingham), the Hon. Secs. to the Union, Messrs. W. G. Davy, of Tamworth, and W. J. Harrison, F.G.S., of Birmingham, besides a large number of local members and friends.

The minutes of the Nottingham Meeting having been read and confirmed, the PRESIDENT delivered an Address dealing principally with the history and archæology of Tamworth and its neighbourhood. This Address will appear in the next Number of this Magazine.



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The Council Meeting was held (by kind permission of Thomas Cooke, Esq.) in the Banqueting Hall of Tamworth Castle, at 12 o'clock, on Tuesday, June 12th. Delegates from sixteen Societies were present; Reports were received from the Hon. Secretaries and from the Management Committee; the draft of the General Report was discussed, and a grant of ten guineas was made towards the funds of the "Midland Naturalist;" a further donation of £2 for the same object being announced from the surplus funds of the late Nottingham Literary and Philosophical Society.

The Annual General Meeting was held in the same room at three o'clock—the President of the Union (Egbert de Hamel, Esq., of Tamworth) in the chair. Among those present at the Council Meeting and General Meeting were—the Rev. H. Norris, Dr. Fleming, Mr. Edward Argyle, the Rev. W. Macgregor, Rev. H. Dale, Rev. C. B. Maude, Mr. Thomas Cooke, Mr. A. A. Clarson, Mr. S. Spruce, F.G.S., Mr. A. Lucy (Tamworth), Rev. J. Thornewill (Burton), the Rev. O. M. Feilden (Oswestry), Professor Milnes Marshall, M.A., M.D., D.Sc. (Manchester), Messrs. W. R. Hughes, F.L.S., T. H. Waller, B.A., B.Sc., W. P. Marshall, M.I.C.E., J. Levick, J. Morley, C. R. Robinson, J. Rabone, J. Insley, C. J. Watson, J. F. Goode, C. J. Woodward, B.Sc. (Birmingham), C. Cochrane and H. Pearce, F.L.S. (Stourbridge), S. J. Newman and B. Thompson, F.G.S., F.C.S. (Northampton), F. E. Lott (Burton), F. T. Mott, F.R.G.S. (Leicester), A. Stephenson, M.D. (Nottingham), W. Mathews, C.E. and E. Wheeler, C.E. (Peterborough), Dr. F. W. Crick (Bedford), W. Madeley (Dudley), B. Sturges Dodd W. Watchorne and T. Goldsmith (Nottingham), the Hon. Secs. to the Union, Messrs. W. G. Davy, of Tamworth, and W. J. Harrison, F.G.S., of Birmingham, besides a large number of local members and friends.

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Mr. F. T. Mott, F.R.G.S., proposed, Mr. T. H. Waller, B.A., B.Sc., seconded, and it was resolved "That the thanks of this meeting be given to Egbert de Hamel, Esq., for his able and interesting address, and that it be printed in the 'Midland Naturalist.'"

Mr. W. J. Harrison then read the

## REPORT OF THE COUNCIL.

In accordance with a resolution passed at the last annual meeting at Nottingham, the report of the Council for 1882 was (in addition to its appearance in the organ of the Union, "The Midland Naturalist") printed in a separate form, with much additional information, and circulated widely among the members of the various Societies.

By another resolution the Hon. Secretary was empowered to send a copy (in bronze) of the Darwin Medal to the family of the late Mr. Charles Darwin, in whose honour the medal was instituted. This has been done, and the following kind reply has been received from the present head of the Darwin family:—

Basset, Southampton, December 14th, 1882.

Dear Sir,—I have the pleasure to acknowledge the receipt of your letter and the copies of the last report of the Midland Union of Natural History Societies, together with the bronze medal of my late father. Will you be kind enough, when you have an opportunity, to express to the Council and Members of the Union the sincere thanks of my family and myself for their kind thought in sending us this copy of the medal. I am pleased to say that it is a striking likeness of my father. My father felt much the honour that was done to him by the foundation of this medal, and was much interested in the success of the Union It would have given him sincere pleasure to know of the good work done by those gentlemen to whom the medal has been awarded. This medal will be placed with others belonging to my late father, and will always be much valued by my family.

Thanking you for the part you have taken in the matter,

I am, Dear Sir, yours faithfully,

W. Erasmus Darwin.

W. Jerome Harrison, Esq., F.G.S.

The subject assigned for the Darwin Prize for 1883 was "Archæology," and the Council have to report, with regret, that no papers on that subject have been contributed to "The Midland Naturalist" within the specified time; the medal for 1883 cannot, therefore, be awarded. The fact is, however, not a matter of much surprise, as but three of the Societies in the Union profess to include Archæology in the list of subjects to which the attention of their members is directed.

Fortunately, however, there is a medal to award at the present meeting: the Darwin Gold Medal, won in 1882 by the Messrs. Marshall, for their excellent paper on "The Pennatulida," was not ready in time to be given at the Nottingham meeting, but, having recently been struck from the dies prepared with so much ability by Mr. Joseph Moore, of Birmingham, is now ready to be handed over.

The subject for the Darwin Prize of 1884 is Botany, and, knowing the large number of able botanists within the ranks of the Union, the Council anticipate the publication of much good work. All papers must be sent in to the Editors of "The Midland Naturalist," or to the Hon. Secretary of the Union, on or before the 31st of March, 1884. The Council regret to announce the dissolution of two Societies during the past year. The Nottingham Literary and Philosophical Society had done excellent work for many years in Nottingham, and the leading part which its members took in the management of the successful meeting of the Union held last year at that town will be long remembered; but with the opening of the new University College there, some of the supporters of the Society seem to have considered its work as completed (surely a mistake!), and the result has been the winding up of the affairs of the Society. The Council gratefully acknowledge a gift of £2 towards the expenses of "The Midland Naturalist" from the surplus funds of the Society.

The Small Heath (Birmingham) Literary and Scientific Society belonged for a short period to the Union. It seceded two years ago, and its secession has been followed by its death.

Notice of withdrawal from the Union has been received from the Shropshire Archæological and Natural History Society, and from the Banburyshire Natural History Society. If these withdrawals be considered as accomplished facts, then the following twenty-two Societies, including about 2,500 members, now form the Midland Union of Natural History and Scientific Societies:—

Bedfordshire Natural History Society and Field Club.
Birmingham Microscopists' and Naturalists' Union.
Birmingham Natural History and Microscopical Society.
Birmingham Philosophical Society.
Birmingham and Midland Institute Scientific Society.
Birmingham School Natural History Society.
Burton-on-Trent Natural History and Archæological Society.
Caradoc Field Club.
Cheltenham Natural Science Society.
Dudley and Midland Geological and Scientific Society and Field Club.
Evesham Field Naturalists' Club.
Leicester Literary and Philosophical Society.
Northamptonshire Natural History Society.
Nottingham G. R. S. Naturalists' Society.
Nottingham Naturalists' Society.
Nottingham Working Men's Naturalists' Society.
Oswestry and Welshpool Naturalists' Field Club.
Oxfordshire Natural History Society.
Peterborough Natural History and Scientific Society.
Severn Valley Naturalists' Field Club.
Stroud Natural History Society.
Tamworth Natural History, Geological, and Antiquarian Society.

Each of the Societies in the Union has held meetings of its members during the winter evenings, and field excursions during the summer. That much good and pleasure have resulted from the intercourse, in this manner, of those having congenial thoughts and aims cannot be doubted, while the General Annual Meeting of the Union ought to widen this useful work by bringing together workers in science from all parts of the Midlands. It seems probable that where there are several Societies in the same town, or in the same district, a joint meeting, at least once during the year, would be of mutual service. Among the interesting local events of the year is the formation, by the Birmingham Natural History Society (at the instance of W. R. Hughes, Esq., F.L.S.), of a Sociological Section, which has already advanced along comparatively new lines in two directions—*(a)* in taking up the study of the works of Herbert Spencer, and *(b)* in conducting an excursion to "George Eliot's Country"—the district round Nuneaton—applying scientific methods, in short, to literary pursuits. The excursion of the same Society to Oban, which will take place in a fortnight after the reading of this report, will be signalised by the application of the most modern methods of research to the examination of the fauna of the sea which washes the western coast of Scotland. Another event of the past year has been the reorganising of the "Sections" of the Leicester Literary and Philosophical Society on a popular basis. This Society is the oldest in the Union, and the important work which it carries on in aiding the Leicester Museum, and in bringing down to Leicester scientific lecturers of the highest eminence during the winter, necessitates a subscription of one guinea per annum. The "Sections," however, which meet frequently for the practical study of Botany, Geology, etc., have now been thrown open to earnest students at a subscription of half-a-crown. Many excellent lectures are delivered every winter by local members of the various Societies, and the Council would suggest to the Hon. Secretaries of the different Societies that they should ascertain if local lecturers of ability connected with their Society would consent to deliver their lectures elsewhere, and communicate the lecturer's name, subject, etc., to the General Hon. Secretary of the Union; in this way an interchange of lectures might be effected which would be very beneficial.

*Science Teaching in Elementary Schools.*—The introduction by Mr. Mundella of a new educational code has given an impetus to the great work which is being carried on in the schools of the Birmingham School Board. An excellent laboratory and lecture room has been completed in connection with a new school, and this forms the head-quarters of the system by which 2,500 children (of ages from eleven to fifteen) are instructed in Mechanics, Magnetism and Electricity, Domestic Economy, and Animal Physiology; more than 200 teachers also receive instruction. An examination for seven valuable scholarships and numerous prizes was lately held by Professor Poynting, M.A., of the Mason College, who reports as follows: "I think that the general style of work sent in was very satisfactory. The average

number of marks obtained was not quite so high as last year, as the subject was far more difficult, and the paper I set was also much harder, but I think that quite as much ability was shown on the part of the candidates, and that the evidence of careful teaching was quite as strong. The paper worked by the first boy was an excellent one, and showed considerable power." Surely the Birmingham Societies ought to reap a goodly crop from this field in years to come! Visits of inspection have been made during the year by Mr. Mundella, M.P., Mr. Rathbone, M.P., Lord Norton, the Royal Commissioners for Technical Education, Professor Gladstone, F.R.S., W. Lant Carpenter, Esq., F.L.S., and other eminent men. The fine Optical Lantern presented by Messrs. R. and G. Tangye has been used with great success in showing scientific illustrations to large evening audiences, and Mr. Richard Tangye has continued to evince his great personal interest in the work. His desire for its extension is shown by his recent offer to the adjoining School Board of Smethwick to pay half the salary of a science demonstrator if they will introduce the system into their schools.

*Geology*.—Last year's report contained a reference to a paper written by your Honorary Secretary (and published in the Proceedings of the Birmingham Philosophical Society) upon the Quartzite Pebbles of the Midlands, in which they were referred to local sources. A paper by Professor Bonney has recently appeared in the "Geological Magazine" (May No.), in which he strongly controverts this view, and refers these pebbles to Scotch rocks, mainly on the ground of the mineralogical resemblances between the two which are revealed by the aid of the microscope. On the other hand, Professor Hull, the original author of the theory which derived these Midland pebbles from the Old Red Conglomerates of Scotland, writes to the same Magazine, giving up this theory and adopting Mr. Harrison's in its entirety. This is a subject on which local help would be most valuable. About 200 copies of Mr. Harrison's paper have been distributed to Midland geologists, and he will be pleased to forward a copy to anyone desiring to study the subject. Another paper by the same author describing the work of that best of scientific societies, the Palæontographical, has been reprinted from the "Journal of Science," and 2,500 copies have been presented to the Union for distribution among its members. The meeting at Tamworth is specially fortunate in that it permits of an examination of the Cambrian rocks which were discovered last year by Professor Lapworth and Mr. Harrison: the famous quartzite ridge which runs from Hartshill to Nuneaton offers a geological problem of the highest interest and importance. No fossils have as yet been found in it; it is underlaid by volcanic rocks probably belonging to the Charnwood series; it is overlaid by Cambrian shales which *do* contain fossils, though they are, as yet, few in number, and of wide range. What is the age and true geological position of the quartzite? This will be a hard nut to crack, and will doubtless

furnish material for the hammers of Midland geologists for many years to come. Let us be thankful for it!

*Boulders.*—In boulder work the event of the year has been the notice by Dr. Crosskey of many remarkable striations on the basalt of the Rowley Hills near Dudley; boulders of the same rock, similarly striated, have lately been found near Birmingham.

*The Organ of the Union.*—"The Midland Naturalist" has continued to appear with regularity under the management of its editors, Mr. E. W. Badger and Mr. W. J. Harrison. Five volumes have now been completed, and during the last year the following papers have appeared in it:—"The Flora of Warwickshire" (continued), by J. E. Bagnall; "Summer Migrants," by O. V. Aplin; "Fungi of the Neighbourhood of Birmingham," by W. B. Grove; "Meteorology of the Midlands" (continued), by C. L. Wragge; "Report on Pennatulida" (continued), by W. P. and A. M. Marshall; "Minerals of the Midlands" (continued), by C. J. Woodward; "Botanical Rambles," by J. E. Bagnall; "On a Dragon Fly," by Silvanus Wilkins; "*Floscularia regalis*," by Dr. Hudson; "Breeding of the Grebe," by O. V. Aplin; "Nomad Fungi," by W. B. Grove; "Underground Fungi," by M. J. Berkeley; "A Visit to Glen Clova and Callater," by G. Claridge Druce; "Geology of Wyre Forest," by A. H. Atkins; "Ben Nevis in Mid-winter," by C. L. Wragge; "Truffles in Shropshire," by W. Phillips; "Dredging at Oban," by J. F. Goode and W. P. Marshall; "Migratory Birds in North Oxfordshire," by O. V. Aplin; "Hedgerows of Leicestershire," by F. T. Mott; "Fertilisation of Saxifrages," by J. G. Ogle; "Drift of Leen Valley," by J. Shipman; "*Arum maculatum*," by R. Rogers; "Ornithological Notes from Leicestershire," by T. Macaulay; "On Pen Pits," by H. B. Woodward; "Northampton Sand of North Oxon," by E. A. Walford; "British Trap-door Spider," by F. Enock; "Sociology," by W. R. Hughes; "An improved System of Arrangement in Provincial Museums," by F. T. Mott; and "*Lychnis Flos-cuculi*," by R. Rogers. In addition, a large number of notes, gleanings, correspondence, and reviews have appeared; a monthly table (involving much expense in its preparation) of meteorological observations from more than sixty stations has been printed, and the general high character of the Magazine for correctness and care in printing has been maintained. Year after year complaint has been made, in the Report, of the scanty support received by the "Midland Naturalist" from the members of the Union, whose organ it is. The falling off in subscribers has been such that the publishers have given notice to the Council that it is their intention to terminate the agreement under which they now publish the Magazine at the end of the present year. As some remedy for this state of things the Council has made a grant of Ten Guineas to the funds of the Magazine, and earnestly calls upon every member of the Union to render to the periodical a hearty support.

A cordial invitation from the Peterborough Natural History and Scientific Society has been received, inviting the Union to hold its

Annual Meeting at Peterborough in June, 1884; and your Council recommend the acceptance of this kind invitation. The district will be, to most of the members, a new and doubtless a most interesting one, while the energy and ability which have been displayed in the management of the local Society place the success of the meeting beyond a doubt. For the meeting of 1885 a movement is taking place among our Societies in the west, which it is to be hoped will result in their uniting to invite the Union to visit some western town in that year, while from Bedford and Oxford invitations will probably come for either that year or the next.

Your General Hon. Secretary—Mr. W. Jerome Harrison, F.G.S.—has served the Union in that capacity for the greater part of the time which has elapsed since its formation, while he has acted continuously as one of the editors of "The Midland Naturalist" for the same period. At the earnest request of the Council, Mr. Harrison has consented to continue to serve the Union for another year, Mr. T. H. Waller, B.A., B.Sc., of Birmingham, becoming his coadjutor. In recognition of his work, your Council has elected Mr. Harrison Vice-President of the Union.

The Local Secretaries for the coming year will be Messrs. J. W. Bodger and W. Mathews, C.E., of Peterborough, gentlemen who are well known to many of those who regularly attend the Annual Meetings as earnest supporters of the Union. In conclusion, the Council desire to thank the members of the Tamworth Society for the admirable arrangements which they have made for the success of the present meeting, and to express on behalf of the visitors from other Societies here assembled their appreciation of the care and trouble which have been taken to give pleasure to the members here assembled, and to promote the objects of the Midland Union.

It was resolved, on the motion of Mr. S. J. Newman, seconded by Mr. B. Thompson, F.G.S., F.C.S., "That the Report be received, adopted, and printed in the "Midland Naturalist."

## PRESENTATION OF THE DARWIN GOLD MEDAL FOR 1882.

The President then handed the Darwin Gold Medal for Zoology to W. P. Marshall, Esq., M.I.C.E., and Professor Milnes Marshall, M.A., M.D., D.Sc., &c. (of Owens College, Manchester).

The receipt of the Medal was acknowledged by Professor Marshall in a very able speech, in which he specially called attention to the fact that the labours of the great man whose name was associated with that Medal were carried on, for the most part, without the aid of expensive or complicated apparatus and methods of experiment; the cause of Science could be advanced by every worker who possessed love of nature coupled with powers of observation of common things.

## THE MEETING-PLACE FOR 1884.

A cordial letter of invitation from the Peterborough Natural History and Scientific Society was read, and this was ably supported by the two delegates from that town who were present—Messrs. WHEELER and MATHEWS.

On the motion of HORACE PEARCE, Esq., F.L.S., and Dr. F. W. CRICK, it was unanimously resolved that the Annual Meeting of the Midland Union for 1884 be held at Peterborough. In accordance with this vote the Union will next year visit a district entirely new to most of its members; a district extremely rich in antiquarian monuments, and abounding in attractions for the geologist, the botanist, and the entomologist. By this vote too the Union acquires as its new President a most eminent divine—the Very Rev. J. J. Stuart Perowne, D.D., Dean of Peterborough—one of the foremost members of the "company" by whom the New Testament revision was carried out.

## THE HON. TREASURER'S REPORT.

Mr. E. de HAMEL, who on this occasion filled the dual office of President and Treasurer, then submitted the following

STATEMENT OF ACCOUNTS,

which, on the motion of the Rev. O. M. FELDEN and Mr. LOTT, was duly adopted.

| Dr. | Receipts. | £ | s. | d. | | | £ | s. | d. |
|---|---|---|---|---|---|---|---|---|---|
| To Balance Brought Forward ... ... ... ... | | 5 | 0 | 8 | | | | | |
| ,, ,, Birmingham Philosophical Society for 1883 | | 1 | 10 | 0 | | | | | |
| ,, Shropshire Archæological (two years compounded) | | 2 | 10 | 0 | | | | | |
| ,, Dudley and Midland Geological and Scientific Society ... ... ... ... ... ... ... | | 1 | 5 | | | | | | |
| | | | | | | | 10 | 5 | 8 |
| ,, Oswestry and Welshpool Naturalist Field Club ... ... | | | | | 40 | 3 | 0 | 10 | 0 |
| ,, Birmingham Philosophical Society ... ... ... ... | | | | | 140 | 3 | 1 | 15 | 0 |
| ,, ,, and Midland Institute Scientific Society ... | | | | | 284 | 1 | 0 | 18 | 8 |
| ,, Severn Valley Naturalist's Field Club ... ... ... | | | | | 65 | 3 | 0 | 16 | 3 |
| ,, Birmingham Natural History and Microscopical Society | | | | | 312 | 3 | 3 | 18 | 0 |
| ,, Caradoc Field Club ... ... ... ... ... ... ... | | | | | 62 | 3 | 0 | 15 | 6 |
| ,, Dudley and Midland Geological and Scientific Society | | | | | 100 | 3 | 1 | 5 | 0 |
| ,, Northamptonshire Naturalists' Society and Field Club | | | | | 200 | 3 | 2 | 10 | 0 |
| ,, Oxfordshire Natural History Society ... ... ... | | | | | 20 | 3 | 0 | 5 | 0 |
| ,, Peterborough Natural History and Scientific Society ... | | | | | 112 | 3 | 1 | 8 | 0 |
| ,, Leicester Literary and Philosophical Society ... ... | | | | | 282 | 3 | 3 | 10 | 6 |
| ,, Nottingham Naturalists' Society ... ... ... ... | | | | | 94 | 3 | 1 | 3 | 6 |
| ,, ,, G.R.S. ,, ,, ... ... ... ... | | | | | 23 | 3 | 0 | 5 | 9 |
| ,, Tamworth Natural History, Geological, and Antiquarian Society ... ... ... ... ... ... ... ... | | | | | 103 | 3 | 1 | 5 | 9 |
| ,, Birmingham Microscopists' and Naturalists' Union ... | | | | | 44 | 3 | 0 | 11 | 0 |
| ,, Nottingham Working Men's Natural History Society ... | | | | | 30 | 1 | 0 | 2 | 6 |
| ,, Banburyshire Natural History Society ... ... ... | | | | | 70 | 3 | 0 | 17 | 6 |
| ,, Evesham Field Naturalists' Club ... ... ... ... | | | | | 35 | 3 | 0 | 8 | 9 |
| ,, Birmingham School Natural History Society ... ... | | | | | 50 | 1 | 0 | 4 | 2 |
| ,, Cheltenham Natural Science Society ... ... ... | | | | | 96 | 3 | 1 | 4 | 0 |
| ,, Stroud Natural History and Philosophical Society ... | | | | | 56 | 3 | 0 | 14 | 0 |
| ,, Bedfordshire: Arrears, £2 17s. 6d. ,, £2 3s. 0d. } £5 0s. 6d. ... ... | | | | | 86 | 3 | 0 | 0 | 0 |
| ,, Burton-on-Trent ... ... ... | | | | | 72 | 3 | 0 | 0 | 0 |
| | | | | | 2,416 | | £34 | 14 | 6 |
| ,, Nottingham Literary and Philosophical Society to "Midland Naturalist" ... ... ... ... ... | | | | | | | £2 | 0 | 0 |

| Cr. | EXPENDITURE. | £ | s. | d. |
|---|---|---|---|---|
| By Treasurer's Expenses, Stamps, etc. ... .. ... ... ... ... | | 0 | 14 | 4 |
| „ Secretary's „ ... ... ... ... ... ... ... ... ... | | 1 | 16 | 6 |
| „ Wright, Dain, Peyton, & Co., Printers, Bill for 1882-3 ... ... ... | | 20 | 18 | 0 |
| „ Joseph Moore, Darwin Medal: One Gold, £8 15s., One Bronze, 3s. 6d. | | 8 | 18 | 6 |
| „ Balance in Hand ... ... ... ... ... ... ... ... ... | | 2 | 7 | 2 |
| | | £34 | 14 | 6 |
| „ Balance against Darwin Die Fund ... ... ... ... ... | | £0 | 17 | 6 |

The usual votes of thanks to the officers of the Union having been passed, Mr. de Hamel was re-elected Hon. Treasurer, Mr. W. J. Harrison General Hon. Secretary (Mr. T. H. Waller agreeing to act as his coadjutor), and Messrs. J. W. Bodger and W. Mathews (of Peterborough) were elected as Local Hon. Secretaries for the ensuing year. The meeting terminated with votes of thanks to the officers and members of the Tamworth Society, who had worked so hard to make the meeting a success—a vote which was acknowledged by the able Local Secretary, Mr. W. G. DAVY—and to the President of the Union (E. de Hamel, Esq.) for his able and courteous conduct in the chair.

## LOCAL EXCURSIONS.

On the morning of the 12th, and while the Council was sitting, many visitors were conducted over some of the local seats of industry, including Messrs. Hamel's tape mills, some large potteries, &c. After the conclusion of the General Meeting the visitors were escorted over the Castle by the resident, Thos. Cooke, Esq. Admiring the magnificent view from the battlements of the keep, peering down into the well in the basement, examining the dungeon and the chapel room, and playing a sort of "hide-and-seek" in the (apparently countless) ghostly and other chambers which, interspersed among ramifying staircases, constitute this grand old pile, an hour was pleasantly passed. Issuing from the Castle about five p.m., a large party were conducted over the magnificent parish church of Tamworth by the Rev. H. Dale; the ascent of the church tower was made by a very remarkable double winding staircase, almost unique of its kind in Britain. The Moat House—a most picturesque Elizabethan mansion —was next inspected, and, finally, the old earthwork, known as "Offa's Dyke," was scrutinised at its point of best preservation.

## THE CONVERSAZIONE.

Diligent hands had been at work, and when the members of the Union entered the Town Hall of Tamworth at the hour of opening on Tuesday evening, June 12th, they found themselves in a suite of rooms which appeared well suited for the purpose of a scientific conversazione, but which had only been made so by much hard work. The following extract from the *Tamworth Herald* gives a good general idea of the programme laid before visitors:—"The appearance of the large room was a treat long to be remembered. Arranged round building were the cases of birds of all sizes, colours, and species, from the huge and magnificent Eagle to the more humble Wren, the Robin, and the Sparrow. On the right-hand side of the room was a very fine collection of British birds, lent by Mr. R. W. Chase, of Birmingham, who, during the evening, explained their various habits, &c. Around the end of the building and covering the opposite wall were cases of birds lent by local friends, and it is needless to observe that they formed a source of pleasure, interest, and admiration not only amongst Ornithologists, but likewise amongst the public generally. Several tables were arranged in the centre of the room at which an exhibition of microscopes, by members of the Birmingham Natural History and Microscopical Society, illustrating life—both vegetable and animal—from its earliest to its latest stages, took place. A series of slides showing the microscopic structure of rocks was also exhibited. At the end of the table a great curiosity was shown by Mr. J. Rabone, namely, "Shakespeare's brooch." Numerous pictures of old Tamworth were exhibited in the corridor, whilst in the lecture room were to be seen Norremberg's polariscope and an experiment illustrating the porosity of stone, lent by the Midland Institute Scientific Society; geological specimens, exhibited by Mr. Horace Pearce, F.L.S., F.G.S.; geological specimens, exhibited by the Rev. W. Robinson; relics discovered at Stapenhill, an ancient burial-ground near Burton-on-Trent, lent by the Burton Archæological Society; Roman pig of lead, found at Hints, near Tamworth; coins and pottery, discovered at Alvecote, near Tamworth; coins, temp. William I. II., some minted at Tamworth, found near the fortifications of the town, 1876; ancient document and leaden case, found in south wall of Tamworth Church; charters of Tamworth; town regalia; communion service, from disused chapel, Statfold; Egyptian and Icelandic curios; a collection of tokens and a large number of miscellaneous exhibits. During the evening Mr. W. J. Harrison, F.G.S., delivered two lectures on astronomy and geology, each being illustrated with lantern slides. The proceedings were enlivened at intervals by music, and the large number of ladies and gentlemen who attended were loud in their expressions of appreciation and admiration of the result of the efforts of the local committee."

## SECOND DAY.—WEDNESDAY, JUNE 13TH.

### EXCURSION TO HARTSHILL.

The Hartshill party, numbering about forty, were under the expert leadership of Mr. E. de Hamel, ably assisted by the Rev. H. Norris and Mr. Clarson. As full details respecting the history of the various points visited during the day are given in the presidential address, we shall here only glance at the main features of the route. Starting from Tamworth about ten a.m. on a lovely June morning, the first halt was made at Polesworth, where the party were escorted over the fine church by the vicar, the Rev. J. G. Trotter. From this point a pleasant drive along the famous Watling Street took the party to Merevale Park, where the ruined Abbey and grand church were inspected by the mass of the visitors, while the geological section, under the guidance of Mr. Harrison, plied their hammers in a neighbouring quarry. Following this came a delightful drive through Merevale Park and Bentley Wood, until the old British camp of Oldbury was reached, where the fine Hall was seen to stand in the very centre of the ancient entrenchment. Here C. R. Cox, Esq. most hospitably entertained the party to luncheon, acting as guide, too, in a visit to a large quarry not far off. Tripping pleasantly through another wood, Hartshill Castle and tumulus were next examined. Here a local resident—Mr. Tippetts—exhibited some interesting Roman pottery, and a table at which Henry VII. is said to have dined the day preceding the battle of Bosworth. At Hartshill the geologists, already favoured with the company of Professor A. H. Green, received a strong reinforcement in the persons of Mr. W. H. Hudleston and Professor Morris, who had come down from London to examine the recently discovered Cambrian rocks near Hartshill. Time was all too short for the work that had to be done, and a rapid drive from Hartshill through Mancetter landed the excursionists at Atherstone, where tea was provided at the "Red Lion," and where the leader received his well-earned meed of thanks. Reaching Tamworth at seven o'clock the party separated with mutual congratulations and renewed wishes for an equally pleasant and profitable day at the Union meeting of 1884.

## THE LICHFIELD EXCURSION.

The Lichfield detachment numbered about fifty, and left Tamworth to proceed in a diametrically opposite direction to the Hartshill party. Mr. Grayston, F.G.S., the leader for the day, called the first halt at Sir Robert Peel's seat of Drayton Manor, where the fine picture gallery and the American garden were inspected with much interest. Driving thence in a north-westerly direction along the Watling Street, the tumuli at Hints and at Offlow were noted, and the village of Wall—The Roman Station, Etocetum—was examined with care, its chief features being pointed out by the Rev. T. F. Rolfe. Lichfield was the main point of the day, and its centre of attraction was, of course, the Cathedral, whose beauties were discoursed upon by Dean Bickersteth, Canon Lonsdale, and the Rev. H. Dale, whose remarks were listened to with great pleasure and instruction. After lunch at the George Hotel the return route was taken through Hopwas Wood and by Whittington Heath to Tamworth, where the party arrived almost simultaneously with the Hartshill division.

# THE TREES OF NORTHAMPTONSHIRE. XIV.

## The Wolsey Elm at Milton Park.

THE following account of the founder of the Fitzwilliam family, and his relations with Cardinal Wolsey, is taken from the *New Encyclopædia of Illustrative Anecdote*, published by Elliott Stock.

"The founder of the family of Fitzwilliam was Alderman of Bread Street, in 1506. Before his death he forgave all his debtors, and wrote upon the erased accounts of each *Amore Dei Remitto*. Cardinal Wolsey was the chief means of this worthy citizen's acquiring his large fortune. After the disgrace of the Cardinal Mr. Fitzwilliam very hospitably entertained him at Milton, Northamptonshire, one of the seats of the present Earl. Henry VIII. was so enraged at this, that he sent for Mr. Fitzwilliam to court, and said 'How! ha! how comes it, ha! that you dare entertain a traitor?' Fitzwilliam modestly replied, 'Please your majesty, I did it not from disloyalty, but gratitude.' The angry monarch then interrupted him by 'How, ha!' the usual exclamation of his rage. Mr. Fitzwilliam, with the tear of gratitude in his eye, and the burst of loyalty in his bosom, continued 'from gratitude, as he was my old master, and the means of my greatest fortunes.' Impetuous Harry was so much pleased with his answer, that he shook him heartily by the hand, and said 'Such gratitude, ha! shall never want a master. Come into my service, worthy man, and teach my other servants gratitude, for few of them have any.' He then knighted him on the spot, and Mr. Fitzwilliam was immediately sworn in a Privy Councillor."

The local tradition differs from the above account only in saying that when Cardinal Wolsey came to Milton Mr. Fitzwilliam dare not take him into the house for fear of the King's anger, but that he entertained him under or near the tree which now bears his name. The old marble vase near the tree is pointed out to the curious as the one in which the Cardinal performed his ablutions, and is shewn in the foreground of the accompanying photograph. The tree, if then in existence, must have been young and healthy, but it is now little more than a ruin.

The photograph was taken in July, 1883.

# NOTES ON THE BIRDS OF NORTHAMPTONSHIRE.

By Lord Lilford, F.L.S.

**99. Swift.** ***Cypselus apus.***

In our immediate neighbourhood we may call the Swift a comparatively rare bird; for, although a few pairs nest in the towers or steeples of some few of the numerous churches within a few miles of us, we have no recollection of ever having seen more than three or four of these birds together hawking over the river during our fishing-expeditions in July. There is no mistaking the present species for any other; its ceaseless activity on wing, the astounding rapidity of its flight, its colour, and its shrill shriek at once distinguish the Swift from any other British bird. We are not able to give any thing like an accurate average date for the first appearance of the Swift in North Northamptonshire; but it seldom appears before the first week in May, and is about the first to leave of all our summer migrants, seldom lingering after the first week in September. Our principal acquaintance with this species was formed in Spain, where it swarms in town, village, and country from north to south and east to west, dashing along the narrow streets of the southern cities with incessant screams, and darting in and out of the gloomy recesses of the cliffs which front the Bay of Biscay. The Swift does not appear to be very particular as to locality for its nest; darkness seems to be the only absolute requisite: crevices in rocks, under the eaves of buildings, high or low, these birds make their homes, often in the faces of precipices inaccessible to man, and again under the roofs of cottages, where they can be destroyed by the enemy with no more complicated weapon than a walking-stick. The nest of the Swift is a shallow arrangement of dried grasses and a few feathers, glued into a saucer-shape by secretions of the parent birds. In a nest in our possession are many wing-cases of beetles and apparently small scales of bark; in this case very few feathers have been used. The eggs are generally three, of a dull white, and much elongated in shape; the young broods generally make their first appearance out of the nests in the second or third week of July. It is a common fallacy that the Swift cannot rise from a level surface; but we have more than once seen birds of this species take wing, with very little apparent effort, from the deck of a vessel and from the surface of a polished table. This bird is a common summer visitor to almost all parts of Europe, and, curiously enough, was the earliest of the true spring migrants observed by us at Algiers, where three Swifts put in an appearance on February 11th, 1878,

the main body, however, not arriving till the end of March. In certain spots in Andalucia a very similar and closely-allied species, the Pallid Swift, *Cypselus pallidus* (Shelley), is abundant in Summer. The habits and manner of nesting of this bird appear to differ in no respect from those of the Common Swift; but the Pallid Swift is an extraordinarily local species, and, although very abundant at Gibraltar and Malaga, has not hitherto been met with at Seville or, indeed, at Algeciras.

100. NIGHTJAR. *Caprimulgus europæus.*

This bird, better known as "Goatsucker," "Night-Hawk," and also often called "Fern-Owl," is by no means common in the neighbourhood of Lilford, though of late it seems to be more often met with than was the case thirty years ago. We have no sandy heaths or pine-woods with patches of bracken, such as these birds love; but in the few woods in our locality in which there is any large quantity of fern a pair or two of Nightjars may be generally found during the summer; and a stray bird is now and then to be seen in the Lilford plantations at that season; but most of the recent occurrences of this bird with us have been in the early part of September in turnip-fields or on the roads, evidently on their southward migration. In many of the southern counties of England this bird is very common, and we have often seen as many as a dozen individuals in a summer evening's stroll in various parts of Devonshire, whilst the air resounded with their curious note, which is difficult to describe, but has been compared to the sound of a spinning-wheel. We have occasionally noticed the Nightjar during this performance, which appears always to be produced whilst the bird is at rest; but these birds frequently utter a very different note whilst flying, which the editor of the fourth edition of 'Yarrell's British Birds' likens to the swinging of a whip-thong in the air. This species generally arrives in this country in the first fortnight of May; we have found eggs on the twenty-first of that month: no nest is made, the eggs being laid on the bare ground, and the same spot used year after year. So much do these birds adhere to their favourite nesting haunts that, on one occasion, in Merionethshire, on asking a lad if he knew of any "Fern-birds'" eggs, he told us that he had not seen any that season, but could take us to some at once, and immediately did so, the eggs in four out of five cases being found on, or within a few inches of, the spot on which our companion had found them in previous years. The Nightjars complement of eggs seems never to exceed two; their ground-colour is white, with a varied and beautiful marbling of various shades of brown and lilac; to our eyes they are amongst the most handsome of British birds' eggs. The flight of the Nightjar is silent, rapid, and buoyant, with constant twists whilst they are in pursuit of their prey, which consists

principally of moths and cockchafers; in Devonshire the small chafers locally known as "fern-web" appear to be the favourite prey of this species. This bird, though fond of the shade, delights in warmth, and may often be found basking upon bare stony spots in old quarries and similar localities in the full glare of the sun; nor, in spite of its crepuscular habits, does its sight appear to be at all affected by bright sunshine; it is very frequently found on sandy roads and paths, where it dusts itself, after the manner of the game-birds. The Nightjar generally sits lengthways, or, as a sailor would say, "fore-and-aft," on a branch, and not across it as most birds, and crouches close to its seat with the head lower than the body. We have met with this species in all parts of Europe which we have visited in the summer; it is especially common in the sandy forest-districts of Germany, but in central and southern Spain is not so abundant as the Red-necked Nightjar *(Caprimulgus ruficollis)*.

101. Cuckoo. *Cuculus canorus.*

This well-known bird arrives in our district generally between the 12th and 20th of April, and immediately proclaims its presence by its loud and mellow call, of which its common name with a stress on the second syllable is a very fair imitation. So much has been written on the habits of the Cuckoo by observers far more competent than ourselves, that we do not propose to go into any lengthy details concerning them, but merely state a few particulars of our personal observations of the bird in our own neighbourhood. The valley of the Nen, where we know it best, viz. between Thrapston and Oundle, appears to have a very special attraction for the Cuckoo; its numbers of course vary in different years, but in no part of our own or any other country with which we have any acquaintance have we met with more of this species or found so many of their eggs as in the locality just mentioned. The Cuckoo is most noisy and conspicuous a few days after its first arrival, the male birds, as is the case with many migratory species, coming before the females; the latter are certainly in the minority, and the supply is apparently by no means equal to the demand; for constant quarrels and occasionally fierce encounters take place amongst the males, the vanquished generally retiring to a short distance and relieving his ardour by incessant clamour. We have been reminded on these occasions of the scenes frequently to be witnessed amongst Red Deer in Scotland in the month of October; in both cases it frequently occurs that during a hot engagement between two champions, a third suitor seizes the opportunity; for these birds certainly do not pair, but the hen accepts the attentions of an indefinite number of the other sex. During these skirmishes the male bird often utters a somewhat guttural chiding note, and now and then appears to

to have a difficulty in getting out a full "cuckoo," stopping short at the first syllable, whilst the female occasionally produces a cry which somewhat resembles that of the Green Woodpecker when heard at a considerable distance. In our neighbourhood the nests generally selected by the Cuckoo are those of the Reed-Warbler; we have also found the eggs of this bird in nests of the Pied Wagtail, Tree-Pipit, Hedge-Sparrow, Redstart, Spotted Flycatcher and Sedge-Warbler; a footnote appended to the description of the Cuckoo in the fourth edition of 'Yarrell's British Birds' states that the nests of no less than seventy-eight species of birds have been recorded as containing eggs of this species. Our conviction is that the Cuckoo generally lays her egg on the ground, and carries it in her bill to place it in the nest she has selected, as we have before stated when treating of the Reed-Warbler; and this habit has, no doubt, led to the common belief that the Cuckoo sucks the eggs of other birds, of which we have never been able to meet with any authentic confirmation. The egg of this bird is, comparatively speaking, small; those which we have personally found vary little, the ground-colour being white, with a pretty close speckling of grey-brown, occasionally very closely resembling those of the Pied Wagtail in colour, but more elongated in form. We have never met, except in the instance of the last-named foster-parent, with a Cuckoo's egg which could possibly be mistaken for one of those of the rightful owners of the nest in which it was found; but it would appear that various ornithologists maintain that the Cuckoo has the power of occasionally assimilating her eggs to those of the species in whose nest she deposits them. There seems to be no doubt that the young Cuckoo very soon after being hatched ejects any other occupant of the nest; very curious details on this subject will be found in the edition of 'Yarrell's British Birds' above cited, on the authority of Edward Jenner and others; our own experience goes to prove, at all events, that the young interloper is invariably alone in his usurped home a very few days after making his first appearance. The motive which induces small birds of various species to mob and follow the Cuckoo as they sometimes do is impossible to account for, more particularly because it is by no means a constant habit; and if the resemblance in shape and manner of flight to a Hawk were the true cause, we should expect to see the Nightjar exposed to the same annoyance. The growth of the young Cuckoo is very rapid, and it generally leaves the nest within a fortnight of being hatched. We have frequently been startled on looking into a Reed-Warbler's nest by the gaping yellow mouth of one of these youngsters, who completely filled and sometimes overlapped his little domicile, and snapped savagely at our fingers. The assiduity with which the young Cuckoo is fed and attended by his foster-parents after leaving the nest is probably well known to most of our

readers, and has been previously alluded to by us when treating of the Pied Wagtail in these Notes. As far as we have been able to ascertain, the principal food brought by the deluded guardians consists of their own natural prey, gnats, small flies, and beetles; but as soon as the Cuckoo can take care of itself hairy caterpillars are undoubtedly its favourite morsels. The young Cuckoo, on leaving the nest, generally sits on a bare bough on some open spot near its birthplace, continually uttering a shrill and tedious cry. The old Cuckoos are silent after the middle of June, and leave us altogether in July, the young birds generally following them about the end of August; but we have often met with a lingerer in the early part of September; and this year (1882) a young Cuckoo, presumably hatched in the immediate neighbourhood was constantly seen near the boat-house at Lilford till the 25th of that month. We have had several Cuckoos in confinement, and in one instance succeeded in keeping one of these birds through two winters; this individual, after about three months of cage-life, began to pick up his own food, and moulted out very clean, but, though perfectly tame and very spiteful, became restless at the seasons of migration, and spoiled his plumage by constant attempts to escape; at other times he would sit stolidly on his perch, continually chirping; we once only heard him attempt to say "cuckoo," but the attempt was a grievous failure. This was the only caged bird of this species in our possession which we ever knew to feed itself, or indeed managed to keep alive for more than a few months. The Cuckoo is a common summer visitor to all parts of Europe.

102. HOOPOE. *Upupa epops.*

The Hoopoe is one of those species which, although it cannot be considered a very rare bird in Great Britain, is not permitted to become common with us, its conspicuous appearance and its fearlessness of man rendering it an easy prize to the first idle fellow with a gun who meets with it on its arrival on our shores. The local birdstuffer will always give a price for a Hoopoe, and, we regret to say, in many instances obtains a much higher one from those collectors who attach a perfectly fictitious value to a bird (however common it may be on the continent) because it has been murdered in our own country. This species generally visits our shores in the spring: several instances of its having nested in England are on record; and were it not for the causes above mentioned, this most ornamental and harmless bird would in all probability become a common and well-known summer resident, at all events in our southern and, probably, in many of our midland counties. In Northamptonshire we are acquainted with at least three authentic occurrences of this bird, the earliest in date having been kindly communicated by the Rev. J. Holditch, of Bulwick Rectory, who, in a

letter to me dated February 25, 1876, writes as follows:—"Passing by coach through Denton, near Whiston, April 19, 1845, I saw a beautiful specimen of the Hoopoe which a man had just shot there; he said that he had been after it for some time, and would not part with it." Mr. J. Hensman has informed me that a Hoopoe in the Northampton Museum was shot at Brixworth in August, 1865; and Lady Lyveden has often told me of one of these birds seen by her and Lord Lyveden whilst driving from Oundle to Farming Woods. This bird was first seen by my informant on the road, along which it continued to take short flights for some distance as the carriage approached, and it eventually turned off into a field adjoining the said road in the neighbourhood of Spring Wood. Lady Lyveden tells me that she again saw the Hoopoe about the spot on which it was first met with on the afternoon of the same day, which was in April; of the year I regret to say that I have no exact record, but Lady Lyveden's impression is that it was either in 1866 or 1867, I have a recollection of having been informed many years ago by the late Ambrose Isted, Esq., that a Hoopoe had been shot near Ecton, but I have no note or particulars of this occurrence. This bird is known as a summer visitor to most parts of Europe, and is exceedingly common in Southern Spain, arriving in March and, for the most part, disappearing about the end of September; but a lingerer or two of this species may occasionally be met with during the winter months. The Hoopoe particularly affects groves of old hollow trees in the neighbourhood of grass lands, and seems fond of the vicinity of houses, our experience being, as above stated, that this species is very fearless of man, but easily frightened by other birds; at all events we have often approached a Hoopoe to within a few yards without concealment of any sort. These birds spend a good deal of their time in strutting about on the ground, seeking for ants and other insects, with a continual nodding motion of the head, somewhat reminding one of the actions of the Pigeon family; the crest is generally carried closed, but raised at once on the slightest alarm, and almost always on alighting after a flight. We have often seen these birds probing into moist earth after the manner of the Snipe; but they seem generally to pick their food from the surface. They seldom take long flights, except when migrating, but flit from tree to tree or along roads and footpaths, of which they seem particularly fond, with an undulating and buoyant action. The love-note of the Hoopoe consists of a note resembling the word "hoop," repeated rapidly three or four times in succession; it has besides this a deep "churr" when irritated, and the young birds hiss vehemently on being disturbed in their nests, and have a short sharp cry for food. I have once or twice seen a Hoopoe cling to and climb a tree for a short distance; but I do not think that this is by any means a common habit. With regard to the

nesting of this species I cannot do better than here quote a note of mine on the subject of which my friend, Mr. Dresser, has made use in his work on the 'Birds of Europe;' it runs as follows:—"The Hoopoe seems, as a rule, to prefer a hole in a hollow ash or willow for nesting in; but I have seen a nest on the ground under a large stone, others in holes on the sunny side of mud or brick walls, one in a fissure of limestone rock, and one in a small cavern. The eggs when first laid are of a beautiful pale greenish blue, but soon become stained and dirty, so that the average Hoopoe's egg is of a dirty yellow colour. In some instances I have found a good deal of nest (bents, feathers, a few small twigs, &c.), in one or two cases no nest at all, the eggs lying on the bare wood, but in almost every instance ordure of some kind, human, bovine, or equine, and invariably an almost intolerable stench." We have kept several young Hoopoes in captivity for some months, feeding them principally upon ant's eggs, mealworms, flies, and earthworms: their manner of killing a worm is by pinching it between their mandibles and rapping it on the ground; when dead the worm is tossed into the mouth and swallowed with a backward jerk of the head. These birds in many instances became very tame, and were very interesting pets, but all died from the same cause, viz. the splitting of their bills and the consequent impossibility of picking up their food. The Hoopoe is fond of dusting itself, and may often be seen so doing on the sandy footpaths and bridle-roads of Southern Europe. The eggs and newly-hatched young of this species are, in Spain, often devoured by the large spotted lizards (*Lacerta ocellata*) which abound in most parts of that country. With reference to the habit of this bird of raising and depressing its crest, a gamekeeper formerly in my father's employment in Lancashire told us that one spring day many years ago a lad came running into his house, and exclaimed, "Bring th' goon, master," assuring him that he had seen a strange bird on the midden close to the cottage, with a cap on its head, which it had thrown off on his approach, and flown into a neighbouring plantation, and that he had searched diligently for the said cap, but could not find it; as they stood talking at the cottage door the bird came back to the dunghill, immediately "put its cap on again," and was, I am sorry to say, at once shot by the keeper; it was, of course, a Hoopoe. Professor A. Newton mentions nine English counties only as unstained with the blood of the Hoopoe at the time of writing his article in the fourth edition of 'Yarrell's British Birds;' but we believe that one of the nine, Warwickshire to wit, can no longer claim this purity.

103. ROLLER. *Coracias garrulus.*

Our reason for including this fine species amongst the birds of Northamptonshire is the fact that on my return to Lilford from Scotland, in

September, 1859, I was assured by three of my sisters that they had all seen and watched for some time from their windows a very brightly-plumaged bird, which was quite unknown to them, in a large beech tree close to the house; I suggested Jay, Green Woodpecker, Kingfisher, an escaped Parrot, and other more improbable birds than these; but all these suggestions were received with scorn, and one of my sisters aforesaid, on seeing long afterwards the plate of the Roller in Gould's 'Birds of Great Britain,' exclaimed at once, without any question from me, "Why that is the bird we saw in the old beech tree!" She assured me she had no doubt whatever on the subject, and her decision was subsequently confirmed without hesitation by the two other sisters who had seen the bird. This evidence is perfectly satisfactory to my own mind; for I cannot conceive the possibility of any other British Bird being mistaken for a Roller at such a short distance as the above bird was from its admirers; and although the Roller has been but seldom met with in England at any very great distance from the coasts, where it generally meets its fate, it has been shot in Cambridgeshire and Hertfordshire, and is by no means one of the most rare of our continental visitors. Our own principal acquaintance with this species has been in Spain, Turkey, and Algeria, in all of which countries it is more or less abundant in summer, and of course always a very conspicuous object, more especially from its habit of sitting on bare boughs, wooden posts, and rails and telegraph-wires, whence it darts upon both flying and creeping insects, and generally returns to its perch in the same manner as our common Spotted Flycatcher and Red-backed Shrike. The Roller is generally considered and has been often described as a shy and wary bird; but our own experience is that we have always been able to procure specimens without much difficulty, and might occasionaly have killed many of these beautiful birds without moving from one spot had we been murderously inclined. This species has a curious habit of turning somersaults in the air, after which performance it generally darts downwards with a harsh and grating chatter; these antics are generally carried on by the male birds while the females are sitting. The flight of the Roller is light and rapid; but on the ground its actions are clumsy and grotesque. The usual nesting-places of this bird are the cavities of hollow trees or holes and crevices in banks and cliffs; but we have known of more than one nest in ruined walls; the materials are a few twigs and some dried grass, but when the birds choose a hole in a sandy bank they seldom make much if any nest. The eggs are very much rounded, of a pure glossy white, and generally five or six in number. Besides their usual insect diet, these birds occasionally take frogs and other small reptiles; we once discovered some remains of figs in the stomach of a bird of this species, but imagine that they were swallowed unintentionally with some insect food. We never could succeed in keeping a Roller alive for more than a few days, as they refused every food we could procure.

*(To be continued.)*

# NOTES ON THE GEOLOGY OF WYMINGTON TUNNEL.

By W. D. Crick,

With a List of Fossils by T. J. George, F.G.S.

The Midland Railway Co. have for some time past been widening their main line and adding a double set of rails to the original ones. To avoid the steep incline between Wymington and Sharnbrook, at a point about two miles south of Irchester station, they have excavated a tunnel through the hill (which rises gradually from either side and is rather flat at the top) instead of going over it. This has been a heavy undertaking—having required a little more than two years to complete—being commenced in March, 1881, and now just finished.

The tunnel, which is about 1,870 yards long (Kilsby is 2,399 yards), is approached from either end by a cutting, and is lined throughout with seven courses of bricks, of which 30,000 were required for every 13ft. 6in., so that about 12½ millions have been consumed in constructing the tunnel. From this an idea can be formed of what an immense enterprise this is, and it will no longer be wondered that about 500 men were usually engaged upon the work.

The hill through which the tunnel is cut is entirely made up of the Upper Glacial Boulder Clay, or, as it has been called by Mr. Wood and Mr. Skertchley, the great Chalky Boulder Clay; it here consists of a dark purplish clay so intimately intermixed with rounded fragments of white chalk, from the size of a pea to that of a hen's egg, as to give it at a little distance a mottled appearance; there are also numerous masses of white chalk let into the clay as it were; large flints that have been well rounded are common, some of them are striated; two flints about the size of a cricket ball have been found, one of them so perfectly rounded as to excite wonder as to its origin, which was set at rest when the other which was not quite so round was broken open and its structure revealed; large septaria, some of them containing Oxford clay fossils, were plentiful. The absence of any stratification is to be particularly noticed.

The clay is first seen in the cutting where the road from Wymington and Puddington crosses the railway, and extends as far south as the cutting at the mouth of the tunnel goes. The shafts have been carried down to a depth of 86ft. from the surface without reaching the bottom of the clay.

This is all that need be said about the clay and its inorganic contents; but owing to the watchful and persistent attention of Mr. C. Fisher, of

Rushden, who had charge of the school at the temporary village erected near the tunnel, and his encouragement to the children to keep their eyes open and bring to him everything they found, we have before us an extensive collection of fossils from a formation usually looked upon by geologists as being barren, unproductive, and very uninteresting. The fossils found are all "derived fossils"—that is they all belong to other and older periods, and have been transported from their original formations to the position in which they were found. No fossil has been found but what can be referred to older beds, although in many cases it is very difficult, and, in some instances where the fossil is common to two beds, impossible, to decide which is the actual bed from which the fossil is derived. They are for the most part from the three large clay deposits of the Kimmeridge, Oxfordian, and Liassic Seas, but there are also specimens from the Cretaceous, Neocomian, and Lower Oolitic Beds; the majority of them are in a good state of preservation, and great credit is due to Mr. Fisher for his perseverance in obtaining them; there is no doubt, if we could find a few more local collectors like Mr. Fisher, that our knowledge of the Palæontology of the various formations in the county would be greatly enriched. One of the choicest fossils in the collection is a very fine specimen of Meyeria Ornata Phil, a Crustacean, which is characteristic of the middle beds in the Speeton Clay; nearly the whole of the carapace is shown; the beautifully ornamented abdomen, with the second, third, fourth, fifth, and sixth epimeral plates of the right side, is also well seen; unfortunately a crack in the nodule in which it was found has, to a great extent, obliterated the cervical groove. A very finely marked small Trigonia (Tri pulchella Ag) is also interesting, for hitherto it has only been found in the Lias clay near the city of Lincoln.

There is no power with which we are acquainted of a natural kind which is producing similar effects to those described except moving ice, and therefore we are justified in asserting that this power caused these effects; and without going into the many theories connected with the glacial period, we might endeavour to learn the further lessons the facts before us can teach.

The origin of Boulder Clay has often been ascribed to the action of icebergs that, floating away from the land from where they had been formed, carried with them vast quantities of mud, sand, and stones, which were deposited at the bottom of the sea as the ice melted; but in the case before us the absence of all stratification, and of all traces of the inhabitants of such a sea, seems to prove the fallacy of this theory. We shall be more correct in assuming that it owes its origin to the direct action of glaciers, and that it is the equivalent of the "ground moraine matter, the maraine

profonde of Swiss and French authors, which is supposed to have a modern parallel in the vast quantity of debris believed to underlie and be pushed forward by the mighty ice-sheet that passes seaward from the great basin of Central Greenland." We must, therefore, try to imagine the whole of this district buried beneath a vast ice sheet—which must have been of great extent, as the lowest estimate of the area covered by the Great Chalky Boulder Clay exceeds 3,000 square miles—the ice was moving slowly from north to south, pushing before and carrying with it portions of the various formations over which it passed, gathering large quantities of the softer materials like clay and but fragments of the harder rocks, mixing them thoroughly together, grinding the harder portions against each other, rolling some over and over until they were almost spherical, and holding others imbedded in the ice so that they were grooved and striated by coming into contact with harder rocks, and then depositing this material in what were then hollows and depressions; and, if we succeed in getting a clear idea of this, we shall have a true picture of the conditions under which this deposit was formed. If this is the correct explanation, the deposit of any part ought to consist mainly of the soft beds nearest to it in the direction in which the ice travelled, with fragments of other beds brought from a longer distance; and there is no donbt from the fossils obtained, and the appearance of the clay at Wymington, that it consists chiefly of re-arranged Oxford and Kimmeridge Clays. The Upper Boulder Clay was deposited at the close of the Glacial Epoch—an epoch which is chronologically very remote—yet when compared with the vast periods of time since the rocks upon which it rests were formed (and these are but of recent date geologically) it is but of yesterday. Since the clay was deposited great changes have taken place in the physical geography of the country. There is no doubt that after the Glacial period England was united to the Continent and Ireland to England and Scotland, and this connection has been severed by the slow work of denudation. Some of our river valleys have been excavated, and others enlarged and deepened. In the valley of the Nene the Boulder Clay is found at about the same level on either side, evidently having been cut through when the valley was formed.

Many animals such as the mammoth, cave lion, cave hyæna, cave bear, the great Irish deer, and others that were alive in this country since the Glacial Epoch, have disappeared from the face of the earth; and whether we believe, as some believe, that our ancestors retreated into the south west of England before the advancing ice, or whether we fix the advent of man at a later date, we all know that since man first chipped Palæolithic, or polished Neolothic flints, a very long time has elapsed in which he could attain to what perfection he has now. From these facts we get an idea as to when the Boulder Clay was deposited.

## *LIST OF FOSSILS.*

### PLANTÆ.

Wood ... ... ... ...

### ZOOPHYTA.

Montlivaltia ? ... A small depressed form, probably a Liassic species.

### ECHINODERMATA.

Acrosalenia An undetermined species which occurs in the Oxford clay.

*Echinocorys vulgaris. *Breynius.* Ananchytes ovatus of Leske and other authors. ... ... Chalk.

Crinoid stems ... ... ... .. Liassic.

### ANNELIDA.

*Serpula vertebralis. *Sow.* ... ... ... Oxford clay.

Serpula tricarinata. *Sow.* ... ... ...

Serpula tetragona. *Sow.*...Ranges from the Great Oolite to the Cornbrash.

Serpula intestinalis. *Phil.* Ranges from the Great Oolite to the Coral Rag.

### CRUSTACEA.

*Meyeria ornata. *Phil.* ... ... ... Speeton clay.

Portion of limb of small Crustacean, probably a Mecocheirus from the Oxford clay.

### BRACHIOPODA.

Rhynchonella concinna. *Sow.* ... ... Lower Oolite.

*Rhynchonella tetrahedra. *Sow.* .. ... Middle Lias.

*Terebratula impressa. *Von Buch.* ... ... Oxford clay.

*Terebratula maxillata. *Sow.* ... ... Great Oolite.

*Terebratula intermedia. *Sow.* ... .. Cornbrash.

### CONCHIFERA.

Monomyaria—

Avicula Munsteri. *Goldf.*... ... ...

*Gryphæa dilatata. *Sow.* ... ... ... Oxford clay.

*Gryphæa incurva. *Sow.* ... ... ... Lower Lias.

Lima duplicata. *Sow.* Ranges through the Lower and Middle Oolites.

Lima gigantea. *Sow.* ... .. ... Lower Lias.

Lima sp. (a cast) ... ... ...

*Pecten æquivalvis .. ... ... Liassic.

Pecten sp. ... ... ... ...

Pinna cuneata. *Bean.* ... ... ... Lower Oolite.

Dimyaria—

Cardinia, two species ... ... ... Liassic.

Modiola sp. ... ... ... ...

| | | | |
|---|---|---|---|
| Myacites—two species | ... | ... | Liassic. |
| Nucula ornata. *Quenst.* | ... | ... | Oxford clay. |
| Nucula sp. ... | ... | ... | Liassic. |
| Trigonia pulchella. *Ag.* | ... | ... | Upper Lias. |

GASTEROPODA.

| | | | |
|---|---|---|---|
| Cerithium sp. ... | ... | ... | Oxford clay. |
| Littorina muricata. *Sow.* | ... | Oxford or | Kimmeridge clay. |
| Phasianella ... | ... | ... | Kimmeridge clay. |

CEPHALOPODA.

| | | | | |
|---|---|---|---|---|
| Ammonites biplex. *Sow.* | | ... | ... | |
| * ,, Jason. *Rein.* | | ... | ... | Oxford clay. |
| ,, excavatus. *Sow.* | | ... | ... | Oxford clay. |
| * ,, serratus. *Sow.* | | ... | ... | Kimmeridge clay. |
| ,, Eugenii. *Rasp.* | | ... | ... | Oxford clay. |
| ,, Hecticus. *Rein.* | | ... | ... | Oxford clay. |
| ,, spinosus. *Sow.* | | ... | ... | Oxford clay. |
| ,, gemmatus. *Phil.* | | ... | ... | Oxford clay. |
| ,, cordatus. *Sow.* | | ... | ... | Oxford clay. |
| ,, Lamberti. *Sow.* | | ... | ... | Oxford clay. |
| ,, vertebralis. *Sow.* | | ... | ... | Oxford clay. |
| * ,, Duncani. *Sow.* | | ... | ... | Oxford clay. |
| ,, triplex. *Sow.* | | ... | ... | |
| * ,, communis. *Sow.* | | ... | ... | Upper Lias clay. |
| ,, serpentinus. *Rein.* | | ... | ... | Upper Lias. |
| * ,, bifrons. *Brug.* | | ... | ... | Upper Lias. |
| ,, capricornus. *Schloth.* | | ... | ... | Lias. |
| ,, bidendatus? ... | | Probably from the | | Oxford clay. |
| Several undetermined species of Ammonites— | | | | |
| *Belemnites Oweni. *Pratt* ... | | ... | ... | Oxford clay. |
| * ,, hastatus. *Blain.* | | ... | ... | Oxford clay. |
| ,, sp. ... ... | | ... | ... | Lias. |
| Phragmacone of Bel. hastatus | | ... | ... | Oxford clay. |

PISCES.

| | | | |
|---|---|---|---|
| Spine of Asteracanthus ornatissimus. *Ag.* | | ... | Kimmeridge clay. |

REPTILIA.

| | | | |
|---|---|---|---|
| Tooth of Saurian ... | ... | ... | ... |
| Vertebra of Icthyosaurus ... | | ... | ... |

* Characteristic fossils.

## METEOROLOGICAL REPORT.—APRIL, 1883.

THE atmospheric conditions of the month were without any special feature of interest—the average conditions of both temperature and rainfall were fairly maintained. A heavy snow storm occurred on the 23rd, from 8 to 9 a.m., with a N.E. wind, registering 0·19 inches of snow.

## MAY, 1883.

May opened cold, dull, and showery, with E. and N.E. winds, which continued until the 11th, when a thunderstorm passed over this district; the rainfall being heavy at Moulton, Wellingborough, and other places in the N.E. and S.W. districts of the country; whilst only 0·17 inches fell in Northampton, 0·61 inches was registered at Castle Ashby, and 0·70 inches at Whittlebury; afterwards the wind veered to the S.W., and we had fine bright warm weather the remainder of the month.

## JUNE, 1883.

June was a fine warm month, interspersed with a few showers and two or three thunderstorms, the heaviest of which occurred from 5 to 8 p.m. on the 25th, when 1·23 inches of rain fell; the lightning was very vivid and did a great deal of damage in various parts of the county. A large fire ball was seen to fall and explode with a terrific noise over Messrs. Manfield and Sons' factory, about 6.30 p.m. The rainfall for the month was excessive, being 0·95 inches above the average of the last 14 years. The mean temperature was slightly below the average—the maximum registered was 82° on the 30th.

F. LAW.

# METEOROLOGICAL OBSERVATIONS, 1883.

## APRIL, 1883.

| STATION. | OBSERVER. | RAINFALL. Total for Month. | Total for Year. | Greatest Fall. In. | Date. | Wet Days. | SHADE TEMPERATURE. Maximum. Deg. | Date. | Minimum. Deg. | Date. |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 1·74 | 8·90 | ·50 | 28 | 10 | .. | .. | .. | .. |
| " .. | S. Law..... | 1·61 | 8·37 | ·44 | 28 | 10 | 65 | 3 | 24 | 1 |
| Castle Ashby .. | R. G. Scriven..... | 1·73 | 8·20 | ·51 | 28 | 9 | 67 | 29 | 29 | 1 & 7 |
| Weedon ..... | F. Capell..... | 1·59 | 9·92 | ·57 | 27 | 8 | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 1·73 | 9·27 | ·56 | 28 | 11 | 68 | 4 & 5 | 26 | 1 |
| Rothwell ..... | J. More, M.D..... | 1·44 | 6 83 | ·50 | 28 | 10 | .. | .. | .. | .. |
| Oundle ..... | S. P. Holloway .... | 2·45 | 8·41 | ·78 | 28 | 9 | .. | .. | .. | .. |
| Towcester ..... | J. Webb ..... | 1·35 | 9·42 | ·39 | 27 | 9 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 1·50 | 8 38 | ·45 | 28 | 9 | 50 | 4 | 22 | 23 |
| Fawsley ..... | Lady Knightley.... | 1·47 | 9·17 | ·45 | 27 | 10 | 59 | 5 | 29 | 1 |
| Thorpe Man'ville | Seth Barnes ..... | 1·32 | 10·31 | ·36 | 27 | 7 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 2·07 | 8·91 | ·52 | 27 | 9 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller..... | 1 53 | 9·82 | ·44 | 27 | 11 | 63 | 4 | 17 | 8 |
| Haselbeach .... | E T. Morgan..... | 1·07 | . | ·38 | 27 | 6 | .. | .. | .. | .. |
| Holdenby ..... | J. Gregory ..... | 1·85 | 10·09 | ·58 | 28 | 9 | .. | .. | .. | .. |
| Average 17 years 1866-82 ..... | H. Terry ..... | 1·79 | 7·22 | .. | .. | .. | .. | .. | .. | .. |

## MAY.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry . ..... | 1·53 | 10·43 | ·35 | 11 | 10 | .. | .. | .. | .. |
| " .. | S. Law..... | 1·64 | 9·92 | ·36 | 26 | 11 | .. | .. | .. | .. |
| Castle Ashby .. | R. G. Scriven..... | 2·19 | 10·39 | ·61 | 25 | 10 | 74 | 23 | 28 | 3 |
| Weedon ..... | F. Capell ..... | 1 82 | .. | .. | .. | .. | .. | .. | .. | .. |
| Pitsford ..... | C. Markham ..... | 1 63 | 10·90 | ·36 | 26 | 12 | 79 | 24 | 28 | 4 |
| Rothwell ..... | J. More, M.D. .... | 1·79 | 10·61 | ·61 | 26 | 13 | .. | .. | .. | .. |
| Oundle ..... | S. P. Holloway .... | 1·94 | 10·35 | ·61 | 26 | 8 | .. | .. | .. | .. |
| Towcester .... | J. Webb ..... | 1·91 | 11·33 | ·47 | 26 | 12 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 1·96 | 10·34 | ·46 | 26 | 11 | 55 | 29 | 25 | 5 |
| Fawsley ..... | Lady Knightley .. | 1·61 | 10·78 | ·41 | 11 | 12 | 71 | 25 | 30 | 3 & 4 |
| Thorpe Man'ville | Seth Barnes ..... | 1·46 | 11·77 | ·40 | 10 | 10 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 1·85 | 10·76 | ·55 | 26 | 9 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller ..... | 2·26 | 12·08 | ·70 | 25 | 14 | 73 | 24 | 26 | 10 & 20 |
| Haselbeach .... | E. T. Morgan..... | 1·88 | .. | ·39 | 8 | 8 | .. | .. | .. | .. |
| Holdenby ..... | J. Gregory ..... | 1·59 | 11·69 | ·34 | 11 | 12 | .. | .. | .. | .. |
| Average 17 years 1866-83 ..... | H. Terry ..... | 1·71 | 8·97 | .. | .. | . | .. | .. | .. | .. |

## JUNE.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 3·13 | 13·56 | 1·22 | 25 | 13 | 81 | 30 | 42 | 16 |
| " .. | S. Law ..... | 3·17 | 13·08 | 1·23 | 25 | 14 | 82 | 30 | 40 | 17 |
| Castle Ashby .. | R. G. Scriven ..... | 2·97 | 13·34 | ·80 | 20 | 11 | 79 | 29 | 40 | 16 |
| Weedon ..... | F. Capell. ..... | 1·52 | 13·26 | .67 | 20 | 6 | .. | ... | .. | .. |
| Pitsford ..... | C. Markham ..... | 3·42 | 14 22 | 1·07 | 25 | 14 | 84 | 29 | 40 | 17 |
| Rothwell ..... | J. More, M D..... | 4·14 | 14·75 | 1·17 | 25 | 10 | .. | .. | .. | .. |
| Oundle ..... | S. P. Holloway .... | 3·01 | 13·36 | 1·00 | 13 | 10 | .... | .. | .. | .. |
| Towcester ..... | J. Webb ..... | 2·01 | 13·34 | ·49 | 15 | 10 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 3·02 | 12·36 | ·81 | 20 | 13 | .. | .. | .. | .. |
| Fawsley ..... | Lady Knightley .. | 2·26 | 13·04 | ·75 | 20 | 13 | 75 | 29 & 30 | 41 | 16 |
| Thorpe Man'ville | Seth Barnes ..... | 2·64 | 14·41 | ·54 | 15 | 13 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 4·34 | 15·10 | 1·77 | 21 | 10 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller .... | 2·85 | 14·93 | ·63 | 10 | 15 | 75 | 29 & 30 | .. | .. |
| Haselbeach .... | E. T. Morgan..... | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Holdenby ..... | J. Gregory ..... | 3·44 | 15·12 | 1·15 | 25 | 13 | .. | .. | .. | .. |
| Average 17 years 1866-83 ..... | H. Terry ..... ... | 2·27 | 13·56 | .. | .. | .. | .. | .. | .. | .. |

HENRY TERRY, SURGEON.

# THE FLORA OF NORTHAMPTONSHIRE.

*(Continued).*

By G. C. Druce, F.L.S.

718. Senecio aquaticus, Hudson. Marsh Ragwort. Fields, etc. Native. Generally distributed.

(Senecio viscosus, Incognita.

Boro' Hill (Notcutt), who puts a note of interrogation against it. I could see nothing of it there, and expect it to have been a variety of S. Sylvaticus which he saw).

722. Senecio campestris, D. C. Field Fleawort. Native. Probably extinct.

Wittering Heath (Morton's History). I have been unable to refind this. It may possibly be found on Southorpe or Barnack Quarries; it still is found in Lincolnshire.

*723. Doronicum Pardalianches. Linn. A garden escape.

East Haddon.

*724. Doronicum plantagineum. Linn.

Naturalised Denton, Plantation near Cransley (W. Lewin), Nene b; hedge side between Kirby and Gretton (W. H. Jones), Welland.

*725. Bidens cernua, L. Nodding Bur Marigold. Wet ditches, marshes. Very rare.

Nene a, canal banks near Northampton; Nene b, Abington (Baker); Yardley Gobion, Ouse.

726. Bidens tripartita, L. River banks and wet places.

Nene a, Harleston, pond side, Lamport, Blisworth, Gayton, etc.; Nene b, Cow Meadow, Delapre, Sewage Works, Easton Maudit (Miss Brent); Nene c, Peterborough; Avon, pond between Rugby and Barby (H. W. Trott), Drayton Reservoir (Notcutt).

A plant growing by the canal side had the upper leaves simple and much resembled *cernua*; it was possibly a hybrid.

728. Inula Helenium, L. Elecampane.

Nene b, Raunds in Home Close and Newton Bromshold (Morton); Nene c, Kingscliffe (Berkeley); Welland, Marholm (Berkeley).

729. Inula Conyza, D.C. Ploughman's Spikenard. Dry banks and waysides. Local.

No record from Nene a or b; Nene c, Brigstock (Lewin), Southorpe (Jones), Peterborough P, Yarwell, old Roman road between Stamford and Oundle, between Oundle and Benefield; Ouse, Potterspury drift-way, near the Queen's oak; Welland, Fineshade to Duddington (Morton), Collyweston, Barnack; Cherwell, Newbottle (French), Warkworth (Beesley).

732. Inula dysenterica, Linn. Greater Fleabane. Wet ditches.

Ouse, Yardley Gobion, Cosgrove, Coppice Moor; Nene a, Moulton (Baker), Dodford (Notcutt), Kingsthorpe, Spratton, Gayton, Tiffield (Norton); Nene b, Hannington, etc; Nene c, Wittering (Sutton), etc.; Welland, Fineshade.

734. Bellis perennis, Linn. The Daisy. Pastures, road sides, etc.

Too well known and frequent to require localities.

It occupies one of the most honoured places in our poetic literature from Chaucer, who named it and honoured it above all—

> "Then love I most these flowers white and red,
> Such that men call daisies in our town,
> To them I have so great affection
> As I said erst when coming in the May,
> That in my bed there dawneth me no day;
> But I am up and walking in the mead
> To see this flower against the sun spread."

Then Milton's—

> "Meadows trim with daisies pied."

While our own poet, thinking probably of himself, writes—

> "Oft will he stoop inquisitive to trace
> The opening beauty of a daisy's face."

Wordsworth, with keen notice, tells of—

> "A drooping daisy changed into a cup,
> In which her bright-eyed beauty is shut up."

And Hood, equally true and with true poetic taste, describes—

> "Daisy stars whose firmament is green."

Then Campbell sings of the past—

> "When daisies and buttercups gladdened my sight
> Like treasures of silver and gold."

Mrs. Browning, with melodious rhythm, writes—

> "Oh, the golden hearted daisies
> Witnessed there before my youth,
> To the truth of things, with praises
> Of the beauty, of the truth."

While Burns'—

"Wee modest crimson-tipped flower,
Thou'st met me in an evil hour,
For I main crush, among the stour,
Thy slender stem;
To spare thee now is past my power,
Thou bonnie gem."

is known to young and old alike, but he frequently refers to the same flower in less known lines; he tells—

"Yet all beneath the unrivalled rose
The lowly daisy sweetly blows."

And of the spring time when—

"Nature hangs her mantle green
On every blooming tree,
And spreads her sheets of daisies white
Out o'er the grassy lea."

And, to conclude, let Wordsworth's high claim be quoted—

"Be violets in their secret mews
The flowers the wanton zephyrs choose;
Proud be the rose with rain and dews
Her head impearling;
Thou liv'st with less ambitious aim,
Yet hast not gone without thy fame,
Thou art indeed by many a claim
The poets' darling."

736.—Erigeron acris, Linn. Blue Fleabane. Dry sandy soil.

Ouse, near Wappenham (Miss Scott); Nene a, Harleston Stone Pits; Nene b, between Cransley and Kettering (Morton's History); Nene c, Wansford (Bodger); Southorpe (Jones); Welland, Fineshade, Collyweston.

740. Solidago Virgo Aurea, Linn. Golden Rod. Sandy ground. Local and rare.

Nene a, Borough Hill (Notcutt), Badby Woods (Morton's History), between Harleston and Duston (Mr. J. Blunt); Nene b, Brigstock Woods.

In Badby Woods var. *augustifolia* occurred, and on Borough Hill a large leaved stout variety was found, which is an interesting plant.

741. Tussilago farfara, Linn. Coltsfoot. Stiff clayey soil. Frequent. Occurs in all the districts.

The Coltsfoot has long been in use as a remedy for coughs, but there appears to have been little real virtue in it. The dried leaves are often smoked instead of tobacco.

742. Petasites vulgaris, Desf. Butter Bur. Moist places. As by shady stream sides, woods, etc.

Avon, Daventry; Cherwell, near Daventry, Canon's Ashby (Rogers); Ouse, Wappenham (Miss Scott), Whittlewood, Furtho, etc.; Nene a, Floore, Dallington (Baker), Lamport, Fawsley, Preston Capes (Wildegoose) Pitsford; Nene b, Great Billing (Baker), Castle Ashby (Rogers); Nene c, Fotheringhay, Wansford; Welland, Stoke Albany.

743. Eupatorium cannabinum, L. Hemp Agrimony. Damp places. In woods, hedge rows, etc.

Ouse, Furtho, Coppice Moor, Whittlewood, Grafton Regis; Nene a, Piddington, Gayton, Litchborough; Nene b, Yardley Chase (Rogers), Easton Maudit, Grafton Woods (Lewin); Nene c, Brigstock, Wansford (Jones), Southorpe, Wittering; Welland, Ufford (Jones), Bainton.

744. Cichorium Intybus, L. Wild Chicory. Borders of fields, on clay soil, etc.

Cherwell, Warkworth (French), Evenley; Ouse, Yardley Gobion, Stoke Bruerne; Nene a, Great Billing, Harleston (Baker); Nene b, Great Billing, Easton (Miss Brent), Abington, Rothwell (Morton's History), var. *alba*, Kettering (Lewin), Denton (Rogers); Nene c, Peterborough (Paley); Welland, Bulwick, Pilsgate (Jones).

The beautiful blue flowers of this species are not uncommon by road sides and in field borders. When gathered they should be put in press immediately, as the petals soon wither. The plant is largely cultivated near Kettering.

745. Lapsana communis, L. Nipplewort. Waste places, road sides, etc. Common and generally distributed.

746. Arnoseris pusilla, Gaert. Swine's Succory. In sandy fields near Spratton (Morton's History).

Rev. M. J. Berkeley informs me he has found this plant there, but it eluded my search.

*747. Hypochæris glabra, Linn. Cat's Ear. Dry fields. Very rare. Blisworth.

*748. Hypochæris radicata, Linn. Long-rooted Cat's Ear. Waste places, fields, etc.

Cherwell, near Banbury (French); Nene a, Harleston, Kingsthorpe, Duston Pits, Blisworth, Farthingstone; Nene b, Yardley Chase, Castle Ashby (Rogers), Irthlingborough, Geddington; Nene c, Peterborough (Paley); Welland, Stamford.

*749. Hypochæris maculata, L. Spotted Cat's Ear. Very rare. Old stone quarries.

Weedon (Baker's History), probably an error; Southorpe and Barnack (Morton's History), Ray's Synopsis, edit. iii., etc. I saw it at Southorpe in 1878.

This plant is queried in Top. Bot., but Mr. Watson was glad to find from the 1878 record that it still occurred in the county.

750. Leontodon hirtus, L. Hairy Hawkbit. Sandy and gravelly fields, etc.

Cherwell, Huscote (French); Nene a, Harleston, Kingsthorpe, Duston Pits; Nene b, Geddington, Grendon (Miss Brent), Castle Ashby (Rogers); Nene c, Peterborough (H. C. Watson); Welland, Collyweston.

751. Leontodon hispidus, L. Rough Hawkbit. Meadows, road sides, etc. Common.

Frequent in all the districts.

752. Leontodon Autumnalis, L. Autumnal Hawkbit. Meadows, pastures, road sides. Common.

Frequent in all the districts. Very variable in appearance—flowering from May to September.

*753. Picris hieracioides, L. Hawkweed Ox-tongue. Dry hedge banks; on calcareous or sandy soil. Local.

Ouse, Yardley Gobion; Nene a, Harpole, Blisworth, Tiffield; Nene b, Grafton Underwood, Brigstock (Lewin), Weldon, Horton, Yardley Hastings (Rogers); Nene c, Peterborough (Paley).

A form approaching *arvalis* was seen at Blisworth.

754. Helminthia echioides, Gaert. Ox-tongue. Hedge sides, waste ground, on stiff soil. Cherwell, Huscote, (Beesley); Avon, Braunston (Baker); Ouse, Whittlebury Forest, Roade to Wootton; Nene a, Moulton, Dallington, Nether Heyford, and Upton (Baker), Long Buckby, Harrington, Maidford (Rogers); Nene b, Grendon (Miss Brent), Yardley Hastings (Rogers), Grafton Underwood; Nene c, Wigsthorpe, Barnwell; Welland, Marholm Woods (Paley).

755. Tragopogon pratensis, L. Goat's-beard. Pastures, etc.

Cherwell, Evenley; Avon, Barby, canal side; Ouse, Grafton Regis, Roade, Yardley; Nene a, Norton (Notcutt); Duston Pits, Danes' Camp, Horton, Blisworth, Gayton; Nene b, Delapre Meadows, Irthlingborough, Castle Ashby, etc. (Rogers), Overstone (Mrs. Birch), Irchester, etc.; Nene c, Wansford, Peterborough (Paley); Welland, Barnack, Pilsgate.

These records are for the variety *minor*.

"The Goat's-beard which each morn at dawn does peep,
But shuts its flowers at noon and goes to sleep." — COWLEY.

*756. *Tragopogon porrifolius, L.* Salsify. On waste ground in Vigo brickyards.

Only a garden escape here as elsewhere in England. It was formerly much used as an esculent vegetable, the young stalks being eaten as asparagus, and the roots boiled as parsnips.

The handsome flowers close about mid-day.

757. Taraxacum officinale, Wigg. Dandelion. Common everywhere.

Var. b. *Erythrospermum.* Dry places. Duston, Harleston, walls Castle Ashby (Rogers).

Var. c. *Lævigatum.* Kingsthorpe, Duston, etc., Castle Ashby (Rogers)

Var. d. *Palustre.* Wet places. Foxhall.

The yellow flowers of the Dandelion are known by every one, and the poets have delighted to notice it.

Ben Jonson says—

"Her treading would not bend a blade of grass
Or shake the *downy blow ball* from his stalk."

While Elliot alludes to its colour in—

"And here the sunflower of the spring
Burns bright in morning's beam."

And then that verse with its hidden truth—

"Dandelion with globe of down,
The schoolboy's clock in every town;
While the truant puffs amain
To conjure lost hours back again."

The following notices in Tennyson have by some been referred to the Goat's-beard, but they certainly are quite as applicable to this plant—

"They, like the arrow seeds of the field flower
The fruitful wit
Cleaving, took root and springing forth anew
Where'er they fell, behold
Like to the mother plant in semblance, grew
A flower all gold."

And again that fine simile—

"As if the flower that blows a globe of after arrowlets
Ten thousand fold had grown, flashed the fierce shield all sun."

761. Lactuca virosa, L. Strong-scented Lettuce. Waste ground.

Cherwell, road side Warkworth (Beesley), and a form approaching *L. scariola* (French); Nene b, near Northampton (Gough's Camden), Great Billing (Baker's Hist.)

761. Lactuca muralis, Fresen. Ivy-leaved Lettuce. Hedge sides, etc. Local.

Cherwell, Aynhoe Park wall (French); Nene a, Dodford Lane; Nene b, Castle Ashby (Miss Brent), between Weekly and Water Mill, growing on old willows (Morton's Hist.), Stanion and Weldon, etc. (Lewin); Nene c, Kingscliff (Lewin).

763. Sonchus oleraceus, L. The Sowthistle. Waste and cultivated ground, road sides, etc.

Abundant throughout the county.

764. Sonchus asper, Hoffm. Rough Sowthistle. In same places as last and almost equally common.

The leaves in this species are more frequently undivided into lobes.

765. Sonchus arvensis, L. Corn Sowthistle. Cultivated fields. Common and generally distributed.

A variety with the pedicells almost glabrous was noticed at Yardley Gobion.

(*Sonchus palustris*, recorded by (Wildegoose) in Baker's History from Preston Capes Lane was this plant).

*768. Crepis taraxacifolia, Thuill. Waste ground and road sides. Local and rare.

Harleston Brickyards, whence it spread to the road side, and eventually into the fields some distance eastwards.

*769. Crepis setosa, Hallfil.

Cherwell, Blowesfield Hulse, near Banbury (Mr. French).

770. Crepis virens, L. Smooth Hawk's-beard. Fields, road sides. Almost everywhere common.

At least two forms occur, one a large stout erect plant with darker phyllaries, and another prostate slender form with small flowers.

771. Crepis biennis, L. Road sides, etc. Local and rare.

Nene a, Harleston road side, Dallington (Mr. Anderson, in New Bot. Guide); Nene b, Irchester (Rev. W. Newbould); Nene c, Peterborough (H. C. Watson).

774. Hieracium Pilosella, L. Mouse-ear Hawkweed. Dry banks and sandy ground.

Avon, Barby (Trott); Cherwell, Warkworth (French); Ouse, Cosgrove Quarries, Roade; Nene a, Harleston, Kingsthorpe, Badby, Boro' Hill; Nene b, Houghton, Castle Ashby (Rogers), Mears Ashby, Overstone (Birch); Nene c, Wittering, Peterborough (Paley); Welland, Harringworth, Barnack (Ufford.)

*799. Hieracium vulgatum, Fries. Dry woods, etc. Local.

Nene a, Boughton Spinney, Blisworth, Badby Wood, Boro' Hill (Notcutt); Nene c, Bedford Purlieus (Berkeley).

*800. Hieracium maculatum, Snr.

Nene a, Boro' Hill (Notcutt).

*802. Hieracium tridentatum, Fries.

Bedford Purlieus (Paley).

This may be correct, but the locality needs re-verifying since Mr. Paley had not made special study of this rather puzzling genus.

805. Hieracium umbellatum, L. Dry hedge banks, etc. Local.

Nene a, Boughton, Blisworth, Badby Woods, Gayton, Boro' Hill (Notcutt); Nene b, on Kettering Links, and in heathy ground called the Kippon (Morton).

808. Hieracium boreale, Fries. Heathy ground. Rare.

Nene a, Badby, Farthingstone, Castle Dykes, Boro' Hill (Notcutt); Welland, Wothorp Grove (Morton's History).

EXCLUDED SPECIES—

*Calendula officinalis*, L. Road side.

Roade, Warkworth (French).

*Petasites fragrans*, Presl. Sweet-scented Butterbur.

Near Kingsthorpe (Rev. J. T. Brown).

*Petasites albus*, Gaert.

Castle Ashby (Rogers).

# A SYSTEMATIC CLASSIFICATION OF THE LEPIDOPTERA WHICH HAVE OCCURRED IN THE VICINITY OF NORTHAMPTON.

By Wm. Hull and H. F. Tomalin.

## Minores.

### Family XVII.—Noctuophalænidæ.[a]

#### Genus I.—Erastria (Treit.)

*Species* 1...*E. Fuscula* (Bork.) ...*Marbled White-spot*
Locality..Northampton.

### Family XVIII.—Chlœphoridæ.

#### Genus I.—Halias (Treit.)

,, 1..,*H. Prasiana* (Linn.) ...*Green Silver-lines*
Locality..Salcey Forest, Yardley Chase, etc.

#### Genus II.—Chlœphora (Steph.)

,, 1...*C. Quercana* (Linn.) ...*Scarce Silver-lines*
Locality..Northampton, Wellingborough.

### Family XIX.—Nycteolidæ.

#### Genus I.—Nola (Leach).

,, 1...*N. Cucullatella* (Linn.) ...*Short-cloaked*
Locality..Northampton.

## F.—GROUP—GEOMETRIDÆ.[b]

### Family I.—Dendrometridæ.[c]

#### Genus I.—Ellopia (Treit.)

,, 1...*E. Fasciaria* (WienVerz.)...*Barred Red*

#### Genus II.—Metrocampa (Latr.)

,, 1...*M. Margaritaria*(Linn.) ...*Light Emerald*[d]
Locality..Yardley Chase, Salcey Forest, etc.

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a The position of this family is uncertain, they having been referred by various authors to the *Tortrices, Noctuæ, and Bombyces.*

Of two hundred and eighty-five British species of Noctuina, we have recorded one hundred and forty-five species.

b The name of Geometers or Loopers is applied to this group from the curious mode of progression of the larvæ. Geometræ, from the Greek Ge—earth, and metron—measure, signifies earth measurers, and is given to them for the following reason: instead of progressing like other caterpillars, they attach their pro-legs to an object, then loop up the body, when they seize near their pro-legs with their claspers, thus in a manner measuring the distance, and looping up the body in the same action.

c The group of the Geometræ we have divided into two main sections, the "Dendrometridæ," and the "Phytometridæ."

d The larva has six claspers instead of four, which is the usual number with the Geometræ.

GENUS III.—ODONOPTERA (Steph.)

*Species* 1...*O. Bidendata* (Clerck.) ...*Scalloped Hazel*
Locality..Northampton, Wellingborough, etc.

GENUS IV.—EUGONIA (Hübn.)

,, 1...*E. Quercinaria* (Hufn.) ...*August Thorn*
Locality..Wellingborough, Harleston, Salcey Forest, etc.

,, 2... ,, *Erosaria* (Bork.) ...*September Thorn*
(*Var.*) *Ochraria* (Steph.)
Locality..Northampton.

,, 3... ,, *Alniaria* (Linn) ...*Canary-shouldered Thorn*
Locality..Northampton, Wellingborough.

GENUS V.—SELENIA (Hübn.)

,, 1...*S. Illustraria* (Hübn.) ...*Purple Thorn*
Locality..Wellingborough.

,, 2... ,, *Illunaria* (Hübn.) ...*Early Thorn*
Locality..Northampton, Wellingborough.

GENUS VI.—PERICALLIA (Steph.)

,, 1...*C. Syringaria* (Linn.) ...*Lilac Beauty*
Locality..Billing Magna, Wellingborough, Yardley Chase, etc.

GENUS VII.—HIMERA (Dup.)

,, 1...*H. Pennaria* (Linn.) ...*Feathered Thorn* [e]

GENUS VIII.—CROCALIS (Treit.)

,, 1...*C. Elinguaria* (Linn.) ...*Scalloped Oak*
Locality..Wellingborough, Hardwick Wood, Northampton.

GENUS IX.—EURYMENE (Dup.)

,, 1...*E. Dolobraria* ... ... ...*Scorched Wing* [f]

GENUS X.—MACARIA (Curt.)

,, 1...*M. Liturata* (Linn.) ...*Tawny-barred Angle*
Locality..Castle Ashby, Harleston Heath.

GENUS XI.—URAPTERYX (Leach.)

,, *U* 1.... *Sambucaria* (Linn.) ...*Swallow-tail*

GENUS XII.—RUMIA (Dup.)

,, 1...*R. Cratægata* (Linn.) ...*The Brimstone*

GENUS XIII.—ANGERONA (Dup.)

,, 1...*A. Prunaria* (Linn.) ...*Orange Moth*
Locality..Hardwick Wood, Sywell Wood, Yardley Chase, etc.

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[e] The name of this insect is derived from the thickly feathered antennæ of the male.

[f] The upper wings of this insect have the appearance of an irregularly scorched piece of paper.

GENUS XIV.—CABERA (Treit.)

*Species* 1...*C. Pusaria* (Linn.) ...*Common White Wave*
,, 2... ,, *Rotundaria* (Haw.) ...*Round-winged White Wave*
,, 3... ,, *Exanthemata* (Scop.) ...*Common Wave*
(*var.*) *Pellagraria* (Green)

GENUS XV.—BAPTA (Steph.)

,, 1...*B. Temerata* (Wien Verz.)...*Clouded Silver*
Locality..Whittlebury Forest, Salcey Forest, Yardley Chase, etc.
,, 2... ,, *Taminata* (Wien Verz.).. *White-pinion Spotted*
Locality..Yardley Chase, etc.

GENUS XVI.—ZERENE (Treit.)

,, 1...*Z. Adustata* (Wien Verz.)...*Scorched Carpet*

GENUS XVII.—ABRAXAS (Leach.)

,, 1...*A. Ulmata* (Fabr.) ...*Scarce Elm*
Locality..Brafield Furze, Yardley Chase, Whittlebury Forest, etc.
,, 2... ,, *Grossulariata* (Linn.) ...*Currant Moth* g
,, 3... ,, *Marginata* (Linn.) ...*Clouded Border*
Locality..Hardwick Wood, etc.
(*var.*) *Pollutaria* (Hübn.)

GENUS XVIII.—HIBERNIA (Latr.)

,, 1...*H. Defoliaria* (Linn.) ...*Mottled Umber* h
(*var.*) *Pulveraria* (Hufn.)
,, 2...*H. Progemmaria* (Hübn.) ...*Dotted Border*
Locality..Northampton, Wellingborough, etc.
,, 3... ,, *Leucophæaria* (Wien Verz.) ...*Spring Usher*
,, 4... ,, *Rupicapraria* ,, ...*Early Moth*

GENUS XIX.—THAMNONOMA (Led.)

,, 1...*T. Variaria* (Linn.) ...*The V. Moth* i

GENUS XX.—FIDONIA (Treit.)

,, 1...*F. Piniaria* (Linn.) ...*Bordered White*
Locality..Harleston Heath, Castle Ashby, etc.
,, 2... ,, *Atomaria* (Hufn.) ...*Common Heath*
,, 3... ,, *Clathrata* (Linn.) ...*Latticed* ,,
Locality...Whittlebury Forest, Yardley Chase, etc.

GENUS XXI.—HEMEROPHILA (Steph.)

,, 1...*H. Abruptaria* (Thunb.) ...*Waved Umber*

g The larvæ causes much destruction to the currant and gooseberry trees.
h The female is wingless.
i The larvæ is very destructive to gooseberry trees.

GENUS XXII.—BOARMIA (Treit.)

SECTION "A."—

*Species* 1...*B. Lichenaria* (Hübn.) ...*Brussels Lace*
Locality..Whittlebury Forest.

SECTION "B."—

,, 2... ,, *Cinctaria* (Wien Verz.) ..*Ringed Carpet*
Locality..Whittlebury Forest, etc.

,, 3... ,, *Repandata* (Linn.) ...*Mottled Beauty*

*(var.) Conversaria* (Hübn.)

,, 4...*B. Rhomboidaria* (Wien Verz.) ...*Willow Beauty*

,, 5... ,, *Consortaria* (Fabr.) ...*Pale Oak Beauty*
Locality..Salcey Forest, Hardwick Wood.

SECTION "C."—

,, 6... ,, *Crepuscularia* (Wien Verz.) ...*Small Engrailed*

,, 7... ,, *Biundularia* (Bork.) ...*The Engrailed*
Locality..Northampton.

,, 8... ,, *Punctularia* (Hübn.) ...*Grey Birch*
Locality..Whittlebury Forest.

GENUS XXIII.—BISTON (Leach.)

,, 1...*B. Prodromaria* (Wien Verz.) ...*Oak Beauty*
Locality..Salcey Forest, etc.

,, 2... ,, *Hirtaria* (Clerck.) ...*Brindled Beauty*

,, 3... ,, *Pilosaria* (Wien Verz.)...*Pale Brindled Beauty* [k]

GENUS XXIV.—AMPHIDASYS (Treit.)

,, 1...*H. Betularia* (Linn.) ...*Peppered Moth* [l]

*(var.) Doubledayaria* (Mill.) ... ,, ,, *(black variety)*

GENUS XXV.—PSEUDOTERPNA (Hübn.)

,, 1...*P. Cytisaria* (Wien Verz.)...*Grass Emerald* [m]

GENUS XXVI.—GEOMETRA (Linn.)

,, 1...*G. Papilionaria* (Linn.) ...*Large Emerald*
Locality..Yardley Chase, Whittlebury Forest.

GENUS XXVII.—PHORODESMA (Boisd.)

,, 1...*P. Bajularia* (Wien Verz.)...*Maid of Honour*
Locality..Harleston.

GENUS XXVIII.—NEMORIA (Hübn.)

,, 1...*N. Thymiaria* (Linn.) ...*Common Emerald*

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[k] Pilosaria, from the hairy appearance of the wings of the male insect. The female is wingless.

[l] The black variety of H. Betularia was obtained by Mr. Russell, and is uncommon in England.

[m] This moth when it emerges from the pupa in wet weather, is suffused with a red tinge.

GENUS XXIX.—ACIDALIA (Treit.)

SECTION "A."—

*Species* 1...*A. Trigeminata* (Haw.) ...*Treble Brown Spot; Fan-footed Wave*
Locality..Saloey Forest.

,, 2... ,, *Bisetata* (Hufn.) ...*Small Fan-footed Wave*
Locality..Saloey Forest.

,, 3... ,, *Inornata* (Haw.) ...*Plain Wave*

,, 4... ,, *Aversata* (Linn.) ...*Riband* ,,

*(var.) Spoliata* (Staud.)

SECTION "B."—

,, 5...*A. Fumata* (Steph.) ...*Smoky Wave*
Locality..Yardley Chase.

,, 6... ,, *Remutaria* (Hübn.) ...*Cream* ,,

,, 7... ,, *Immutata* (Linn.) ...*Lesser Cream Wave*

,, 8... ,, *Imitaria* (Hübn.) ...*Small Blood-Vein*
Locality..Whittlebury Forest, Sywell Wood, etc.

GENUS XXX.—TIMANDRA (Dup.)

,, 1...*T. Amataria* (Linn.) ...*Blood-Vein*

GENUS XXXI.—ZONOSOMA (Led.)

,. 1.. *Z. Orbicularia* (Hübn.) ...*Dingy Mocha*
Locality..Harleston Heath, Yardley Chase, etc.

,, 2... ,, *Omicronaria* (Wien Verz.) ...*The Mocha*
Locality..Harleston Heath, Yardley Chase, Whittlebury Forest.

,, 3... ,, *Punctaria* (Hübn.) ...*Maiden's Blush*
Locality..Harleston Heath.

*(To be continued.)*

## OCCURRENCE OF THE PIED FLYCATCHER, "MUSICAPA ATRICAPILLA" (LINN.), NEAR NORTHAMPTON.

THIS specimen was obtained about four miles from Northampton, in Harlestone parish, on the first of May, 1883, and is the first recorded occurrence of this species in Northamptonshire.

The species is of comparatively restricted distribution, and is migratory, and belongs to the section of the "Passeres." It is a summer visitor, arriving in April, and commencing the southern migration in September.

Lord Lilford, in his "Notes on the Birds of Northamptonshire," Vol. I., page 133, observes that he believes to have seen one near Lilford, in 1853.

It occurs and breeds in Norway, Sweden, and Finland, in the summer, and has been observed in Egypt, Palestine, Western Persia, and Andulucia.

The bird is an adult male of the second year.

There are two other British species of the genus—Musicapa Grisola (Linn.), The Spotted Flycatcher—the more frequent species; and Musicapa Parva (Bech.), The Red-breasted Flycatcher—a very rare species.

H. F. TOMALIN.

## OCCURRENCE OF THE ARGULUS FOLIACEUS UPON THE COMMON "TROUT"—(SALMO FARIO).

THE trout was caught at Holdenby in June of this year, and thirteen of these parasites were obtained from it; they were however near to the abdominal fins, and not fixed just under the pectoral fins as is more common. The occurrence of this parasite upon the trout is very unusual. Thompson, in his *Natural History of Ireland*, records it as having been obtained from this fish; and it has more recently been recorded in the *Field*.

The classification is as follows:—

| | | |
|---|---|---|
| Class ... | Crustacea ... | Ringed animals, with horny or calcareous exterior; limbs articulated, respiration by gills or skin, sexes separate. |
| Order ... | *Siphonostoma ... | (Entomostraca). Mouth, with tube which has pointed mandibles; thorax ringed, with several pairs of feet; foot-jaws large. |
| Group ... | †Peltocephala ... | Head shield-shaped, with frontal plates, and two flattened antennæ. |
| Family... | Argulidæ ... | Head like circular shield, antennæ short, two-jointed, second pair of foot-jaws modified into suckers. |
| Genus ... | Argulus ... | Oval, flat, transparent, veined, shell notched on either side in front. |

The object of the tube and its sharp mandibles is evidently for the purpose of piercing the skin of their prey, and the foot-jaws enable them to hold on very firmly.

The fish-argulus may be found upon various fresh-water fish, the two species of sticklebacks being the more general; they swim gracefully, and have a strong resemblance to the seed vessels of plants.

The female is larger than the male, and is distinguished by the black spot on each side of the abdomen; the width is about two lines. They occasionally leave the fish, but not for a long time.

H. F. TOMALIN,
July, 1883. Northampton.

* Siphonostoma—Tube-mouthed Entomostraca.

† Peltocephala—Buckler headed. They are sometimes termed the Pœcilopoda, or various-footed Entomostraca.

## PHÆNOLOGICAL OBSERVATIONS.

TAKEN BY MARGARET E. KEEP, WOLLASTON, AND W. LAW, NORTHAMPTON.

1883.

IN consequence of the mildness of the early part of the winter many of the late flowering plants of the past season remained in bloom nearly all the winter; for instance—the Gorse, Dandelion, Daisy, Feverfew, white and red Dead Nettle, Groundsell, Chickweed, Creeping Crowfoot, and Herb Bennett; the last was in flower as late as February 4th.

(In the list given below the dates to the plants are for flowers first seen, unless otherwise stated).

| | | M.E.K. | W.L. |
|---|---|---|---|
| Wild Chervil ... ... ... | Anthriscus sylvestris ... | ... | Jan. 4 |
| Aconite (at Farndish, Beds, but close to borders of Northants) | ... | Jan. 6 | |
| Blackird or Thrush singing ... | ... | Jan. 7 | |
| Primrose (in garden) ... ... | Primula vulgaris ... | Jan. 9 | |
| Snowdrop ,, ... ... | Galanthus nivalis ... | Jan. 13 | |
| Field Speedwell... ... ... | Veronica arvensis ... | ... | Jan. 21 |
| Elder (in leaf at Dallington) ... | Sambucus niger ... | Jan. 24 | |
| Wild Pansy ... ... ... | Viola arvensis ... ... | ... | Jan. 28 |
| Lesser Celandine (in meadow near Kingsthorpe Upper Mill, apparently been in flower some days. Jan. 28. W.L.) | Ranunculus ficaria ... | Feb. 6 | Jan. 28 |
| Lark in full song ... ... | ... | Jan. 28 | Jan. 21 |
| Whitlow Grass ... ... ... | Draba verna ... ... | Feb. 4 | Feb. 11 |
| Green Field Speedwell... ... | Veronica agrestis ... | ... | Feb. 4 |
| Coltsfoot ... ... ... ... | Tussilago farfara ... | Feb. 5 | Feb. 18 |
| Hawthorne in leaf (Hinwick Lane) | Cratægus oxyacantha... | Feb. 5 | |
| Honeysuckle in leaf ... ... | Lonicera periclymenum | Feb. 5 | |
| Dandelion ... ... ... | Leontodum taraxacum. | Feb. 6 | |
| Dogs' Mercury ... ... ... | Mercurialis perennis ... | Feb. 6 | |
| Hazel (Catkins)... ... ... | Corylus avellana ... | Feb. 6 | |
| Sweet Violet ... ... ... | Viola odorata .. ... | Feb. 24 | Feb. 11 |
| Primrose... ... ... ... | Primula vulgaris ... | Mar. 2 | Feb. 24 |
| Blackthorn in leaf ... ... | Prunus spinosa... ... | Feb. 24 | |
| Long-tailed Titmouse paring... | ... | Feb. 6 | |
| Rooks building ... ... ... | ... | Feb. 10 | |
| Bat flying about ... ... | ... | Feb. 22 | |
| Sulphur Butterfly ... ... | ... | Feb. 22 | |

| | | | M.E.K. | W.L. |
|---|---|---|---|---|
| Apricot in blossom ... ... | ... | | Mar. 2 | |
| Bramble in leaf ... ... ... | Rubus fruticosus ... | | Mar. 2 | |
| Dog Violet ... ... ... | Viola canina ... ... | | ... | Mar. 4 |
| Crab Apple in leaf ... ... | Pyrus malus ... ... | | Mar. 5 | |
| Wild Gooseberry in leaf ... | Ribes grossularia ... | | Mar. 5 | |
| Privet in leaf ... ... ... | Ligustrum vulgare .. | | Mar. 6 | |
| Hemlock ... ... ... ... | Conium maculatum ... | | Mar. 6 | |
| Wych Elm ... ... ... | Ulmus montana .. | | Mar. 7 | |
| Shepherd's Purse ... ... | Capsella bursa-pastoris. | | Mar. 13 | |
| Marsh Marigold ... ... | Caltha palustris ... | | ... | Mar. 26 |
| Spurge Laurel (at Castlethorpe, Bucks, but close to borders). | Daphne laureola ... | | .. | Mar. 26 |
| Ground Ivy (at Castlethorpe).. | Nepata Glechomá . . | | ... | Mar. 26 |
| 1882. | | | | 1883. |
| M.E.K. | | | | W.L. |
| Ivy-leaved Speedwell... .. | Veronica hederifolia ... | | | April 1 |
| Buttercup ... ... ... | Ranunculus bulbosus ... | | | ,, 7 |
| Wood Anemone ... ... (Apparently been in flower a week when seen) | Anemone nemorosa ... | | | ,, 12 |
| Field Wood Rush ... ... | Luzula campestris ... | | | ,, 12 |
| Blackthorne ... ... ... | Prunus spinosa... ... | | | ,, 15 |
| Cowslip ... ... ... ... | Primula veris ... ... | | | ,, 15 |
| Lady's Smock ... ... ... | Cardamine pratensis ... | | | ,, 15 |
| Ivy-leaved Toadflax ... ... | Linaria cymbalaria ... | | | ,, 15 |
| Box ... ... ... ... | Buxus sempervirens ... | | | ,, 22 |
| Germander Speedwell .. | Veronica chamædrys ... | | | ,, 29 |
| Wood Crowfoot ... ... | Ranunculus auricomus . | | | ,, 29 |
| Jack by the Hedge ... ... | Sisymbrium alliaria ... | | | May 4 |
| Cuckoo-pint ... ... ... | Arum maculatum ... | | | ,, 5 |
| Wild Hyacinth ... ... | Hyacinthus nonscriptus | | | ,, 6 |
| May 5 Rose Campion... ... ... | Lychnis dioica ... ... | | | ,, 13 |
| Great Stitchwort ... ... | Stellara holostea ... | | | ,, 13 |
| Field Scorpion Grass ... ... | Myosotis arvensis ... | | | ,, 13 |
| Dovesfoot Cranesbill ... ... | Geranium molle ... | | | ,, 13 |
| Hemlock Storksbill ... ... | Erodium cicutarium ... | | | ,, 13 |
| Rue-leaved Saxifrage ... | Saxifraga tridactylites... | | | ,, 13 |
| ,, 14 White Meadow Saxifrage ... | Saxifraga granulata ... | | | ,, 13 |
| Crosswort ... ... ... | Galium cruciatum ... | | | ,, 13 |
| Meadow Crowfoot ... ... | Ranunculus acris ... | | | ,, 13 |
| Crab Apple ... ... ... | Pyrus malus ... ... | | | ,, 13 |

| 1883—M.E.K. | | | 1883—W.L. |
|---|---|---|---|
| | Broom ... ... ... ... | Cytisus scoparius ... | ,, 13 |
| | Yellow Dead Nettle ... ... | ... ... | ,, 14 |
| | Thyme-leaved Speedwell ... | Veronica serpyllifolia ... | ,, 14 |
| | Black Medick ... ... .. | Medicago lupulina ... | ,, 14 |
| | Lilac ... ... ... ... | ... ... | ,, 14 |
| | Horse Chestnut ... ... | ... ... | ,, 16 |
| | Lily of the Valley (in garden) | Convallaria majalis ... | ,, 16 |
| Apl. 24 | Hawthorn ... ... ... | Cratægus oxyacantha ... | ,, 19 |
| ,, 24 | Wayfaring Tree ... ... | Viburnum lantana ... | ,, 19 |
| May 13 | Fumatory ... ... ... | Fumaria officinalis ... | ,, 24 |
| | Great Celandine ... ... | Chelidonium majus ... | ,, 27 |
| ,, 5 | Herb Robert ... ... ... | Geranium robertianum .. | ,, 27 |
| | Brooklime ... ... ... | Veronica beccabunga ... | ,, 27 |
| ,, 15 | Herb Bennet ... ... ... | Geum urbanum ... ... | ,, 27 |
| ., 22 | Ragged Robin ... ... | Lychnis flos-cuculi ... | June 1 |
| ,, 30 | Guelder Rose ... ... . | Viburnum opulus ... | ,, 3 |
| ,, 15 | Ox-Eye ... ... ... | Chrysanthemum Leucanthemum | ,, 3 |
| | Poppy .. ... ... ... | Papaver rhœas ... ... | ,, 10 |
| | Woody Nightshade ... ... | Solanum dulcamara ... | ,, 10 |
| | Dog Rose ... ... ... | Rosa canina ... ... | ,, 10 |
| ,, 30 | Pimpernel ... ... ... | Anagallis arvensis ... | ,, 10 |
| | Goosegrass ... .. .. | Galium aparine .. .. | ,, 10 |
| | Wild Sage ... ... ... | Salvia verbenaca ... | ,, 10 |
| | Wild Mignionette ... ... | Reseda luteola .. ... | ,, 14 |
| | Yellow Rattle ... ... | Rhinanthus crista-galli.. | ,, 14 |
| | Yellow Flag ... ... ... | Iris pseud-acorus ... | ,, 14 |
| | Hedge Woundwort ... ... | Stachys sylvatica ... | ,, 17 |
| | Forget-me-not ... ... | Myosotis palustris ... | ,, 17 |
| | Blackberry ... ... ... | Rubus fruticosus ... | ,, 21 |
| | Honeysuckle ... ... ... | Lonicera periclymenum.. | ,, 23 |
| | Bladder Campion ... ... | Silena inflata ... ... | ,, 24 |
| | Black Bryony... ... ... | Tamus communis ... | ,, 24 |
| | Broad-leaved Willow Herb.. | Epilobium montanum ... | ,, 24 |
| | Yarrow ... ... ... | Achillæa millefolium ... | ,, 24 |
| | Wheat ... ... ... | ... ... | ,, 24 |
| | Great Burnet... ... ... | Sanguisorba officinalis ... | ,, 24 |
| | Water Plantain ... ... | Alisma plantago ... ... | ,, 28 |
| | Meadow Sweet ... ... | Spiræa ulmaria ... ... | ,, 28 |
| | Water Figwort ... ... | Scrofularia aquatica ... | ,, 30 |

MARGARET E. KEEP, Wollaston. W. LAW, Northampton.

# NOTES ON SOME FOSSILS FROM THE TRANSITION-BED BETWEEN THE MIDDLE AND UPPER LIAS OF NORTHAMPTONSHIRE.

By Mr. Edwin A. Walford, F.G.S.

*Part I.*

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The palæontology of the period in which the middle Lias deposits pass into the upper Lias, though included in but a few inches of vertical strata, is more remarkable in the richness and character of its fauna than transitional stages ordinarily are. In Normandy, at May and Fontaine-Etoupe-four, the remains of these beds are preserved in the rifts and hollows of Silurian reefs, and there the fauna has been described by M. Eudes Deslongchamps. In

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Bavaria, Dr. Stolickza has recognized a similar fauna, and from the Hierlatz and Adnether beds has collected and made known many beautiful species of Liassic mollusca. In England, according to Mr. Day, Buckland and De la Beche first noticed a like stage in Dorsetshire, whilst his own researches, backed up with the aid of so skilled a palæontologist as Mr. Etheridge, were published by the Geological Society in 1863. Mr. Beesley, in 1873, in a Report of an Excursion of the Geologists' Association to Banbury says, at Adderbury, the "thin top bed forming a transition to the Upper Lias contains Ammonites of Upper Lias type and many fine gasteropods." Prior to my knowledge of Mr. Day's admirable work, I directed attention to and published a list of species from this horizon in the neighbourhood to the North of Banbury, whilst still later Mr. B. Thompson has traced it in the country west of Northampton, and has shown it there also to stretch over a considerable area.

Mr. Day gives a list of fossils from the Marlstone and Pleurotomaria bed, but unfortunately does not seem to have been able to separate the species of the two horizons, perhaps owing to the Marlstone being reduced in Dorsetshire to a few inches of conglomerate. There would seem, however, to be considerable similarity between the Pleurotomaria bed of Dorset and the Transition bed of Northamptonshire, though the latter appears to be better defined both in its lithology and palæontology. The friable marl of Chipping Warden is a matrix which has favoured the collection of a series of well preserved forms, though unfortunately owing to the discontinuance of the use of the Marlstone as a road metal, the section no longer yields its rich harvest.

GASTEROPODA.

*Trochus Gaudryanus (d'Orb.)*

Fig. 3.

The solitary specimen in my collection, which can be referred to this species, shows but a slight difference in the ornamentation of the base. There are fewer tubercles upon the lower angle and a less wide and distinctly ornamented band than d'Orb. figures. Chipping Warden.

*Trochus near to Gaudryanus.*

Fig. 1.

In this variety, which is nearly related to the preceding species, the whorls are not so high, the shell is not so tall, the angles of the whorls are rather less deeply cut, and the tubercles upon them are fewer. There is a row less of nodulated encircling costæ at the base of the lower whorl, and no intermediate (sutural) row of papillæ at the top of the same whorl as in the type form. The four or five upper whorls have only two rows of nodulated papillæ, and the angles are less fully pronounced. Chipping Warden.

*Trochus near to Eolus (d'Orb.)*

Fig. 9.

Height 15 mm., breadth 13 mm. d'Orb. shell is much higher in proportion to its breadth. Rows of tuberculated costæ, 5 to 6, with intermediate rows at the summit and base of lower whorl. The sutural angle of the lower whorl is in some cases very prominent. The base has numerous alternating rows of large and small costæ. Chipping Warden.

*Trochus Eolus var.*

Height 16 mm., breadth 11 mm. Its slightly more slender habit and more deeply indented sutures distinguish this from the other variety described. The tuberculated costæ upon the base have sometimes intermediate and smaller rows. The lower four rows of costæ upon the whorls are alternately large and small. Under the projecting angle of the penultimate whorl is a bold row and also a fine row of nodulated papillæ. Chipping Warden.

*Trochus near to Thetis (Munst.)*

Fig. 4.

Dumortier, who quotes this shell from both upper and lower divisions of his Lias Moyen, describes the whorls as being rather convex; my specimens are, if anything, slightly concave, a feature which is probably owing to the thickening of the vertical ribs at the top and bottom. Fine striæ cover the deep lower suture and cross the bold spiral lines at the base of the shell, a character which Prof. Tate notes in some Gloucestershire forms. *Trochus similis* (Moore) seems to be very closely related to this species, the principal distinction being in the ornamentation of the base—Moore's species having numerous fine transverse lines bifurcating from the carina, whilst *T. Thetis* has a nearly flat base with four concentric ribs. Aston-le-Wall and Appletree. Rare.

*Trochus rotulus (Stol.)*

Fig. 5.

The striæ on my specimens are finer and more numerous than Stolickza figures, and the crenulated angles of the carina scarcely so prominent. Moore's *Trochus Pethertonensis* is very near to, if not the same as this species. Both authors speak of fine spiral or fine bent lines covering the shell. Rare. Aston-le-Wall and Appletree.

*Trochus Pethertonensis (Moore).*

Fig. 8.

Though this may possibly turn out to be the young of *T. rotulus* (Stol.), yet the almost indistinct nodulation of the carinæ and the envelopment of the shell from umbilicus to summit, with very fine striæ, so agree with

Moore's diagnosis, that until further evidence is brought it seems best to let it remain here. The specimen is rather smaller and more depressed than Moore's. The flattened sides and deep umbilicus seem to separate the species from *Turbo Socconensis* (d'Orb.) Rare. Stirch, near Byfield.

*Trochus approaching Mysis (d'Orb.)*

Fig. 7.

Length 8 mm., breadth 5 mm. The lower whorls are more prominently imbricated than d'Orb. type, and their concavity and angles slightly more pronounced. There is one row less of the encircling lines, and the disposition of the others is so different as to give an appearance to the shell almost, if not quite, amounting to specific importance when coupled with the features previously noted. The upper line of granulations is visible only on the lower whorl, and is so closely placed under the projecting edge of the superior whorl as to be with difficulty distinguishable. Hence the body of the whorl appears to be taken up with two prominent lines, which are crossed by strong oblique ribs such as d'Orb. describes.

The specimen was procured from Catesby, by Mr. B. Thompson, F.G.S., by whom it was kindly presented to me.

*Phasianella turbinata (Stol.)*

Fig. 10.

Stolickza describes this shell as elongated, skittle shaped, composed of six to eight nearly smooth whorls, of which the last takes up nearly half the entire height. The last whorl is rounded—the mouth a longish oval pointed at the upper part. Outer lip, sharp entire; inside lip very fine. Base ornamented with very fine spiral lines. The Chipping Warden specimens are much larger than those from Hierlatz; my largest measures 24 mm. in height by 15 mm. in breadth. Two species of Phasianella are mentioned in Mr. Day's paper, and subsequently Prof. Tate quotes *P. turbinata*, from the collection of Mr. T. Beesley, F.C.S., of Banbury. It is the *P. Buvignieri* of my list. Not uncommon. Chipping Warden, Aston-le-Wall, and Appletree.

*Pleurotomaria rustica (Desl.)*

Fig. 6.

The ornamentation of this shell is rather less profuse than d'Orb.'s type, yet it has much more than Sowerby figures in the allied species *Pl. Anglica*. The whorls are slightly less quadrangular than is figured of either species. Stolickza quotes *Pl. Anglica* (Sow.) from the Hierlatz beds, from which, however, my specimen is very well distinguished. Most authors, however, confine the last-named species to the lower Lias. Chipping Warden and Appletree. Not common.

*Pleurotomaria Hierlatzensis (Hörnes).*

Fig. 2.

Stolickza speaks of this shell as being covered with fine spiral and diagonal lines, giving the appearance of lattice-work. In my specimen this character is well marked; and one notes also the tendency of the spiral lines to vanish at the base of the last whorl. There are faint encircling lines in the band on the lower whorl which are rather more conspicuous in its upper part. Rare. Aston-le-Wall.

*Actæonina near to Ilminsterensis (Moore).*

Fig. 12.

Our local specimens attain a much larger size than those figured either by Moore or Tate; my largest measures in height 20 mm., breadth 9 mm. The lower whorl takes up 15 mm., and is covered with about twenty encircling lines of minute punctations, crossed by other equidistant perpendicular lines, with traces of fine striæ between. The encircling lines disappear in the upper part of the whorl, and there is no trace in any of my specimens of the carinal line. In its bluntly keeled whorls and general ornamentation it agrees well with *Actæon tesselatus*, described but not figured by Tate in the Geological Mag., Vol. VIII., p. 9. It is however larger. Not uncommon. Chipping Warden.

*Actæonina Ilminsterensis var.*

Fig. 11.

Length 12 mm., breadth 5 mm. The last whorl measures 7 mm. in height, and is encircled with ten lines of fine punctations, which disappear in the upper third of the whorl. The vertical striæ are very fine and numerous. The line bounding the carina is well marked. It is very near to *Orthostoma fontis* (Dumort.), from which however it appears to be separated by less angular whorls and the carinal line. Rare. Aston-le-Wall.

*I am indebted to Mr. S. Stutterd for his great kindness in drawing and presenting to me the plate which accompanies this paper. The Society will also, I am sure, feel equally indebted to him for his skilled and generous assistance.*

LIST OF FOSSILS IN PLATE.

Fig. 1. Trochus near to Gaudryanus (d'Orb.)
2. Pleurotomaria Hierlatzensis (Hörnes.)
3. Trochus Gaudryanus (d'Orb.)
4. „ near to Thetis (Munst.)
5. „ rotulus (Stol.)
6. Pleurotomaria rustica (Desl.)
7. Trochus approaching Mysis (d'Orb.)
8. „ Pethertonensis (Moore.)
9. „ near to Eolus (d'Orb.)
10. Phasianella turbinata (Stol.)
11. Actæonina Ilminsterensis var. (Moore.)
12. „ near to Ilminsterensis (Moore.)

# MEETINGS OF THE SOCIETY.

## APRIL, 1883.

A MEETING was held in the Curators' room, Guildhall, on Tuesday, the 17th, when various forms of microscope were shown and described. Mr. A. Kempson gave a detailed description of his instrument, and the various fittings. Mr. H. J. Eunson exhibited an early form of microscope, made by Adams in the latter part of the last century, and also a solar microscope.

On the 26th, a general meeting was held in the Council Chamber, when the Rev. S. J. W. Sanders, LL.M., read a paper on "Man—pre-historic, present and future," in which he described the various developments of man's brain power from the earliest days, and the absence of development of brain capacity, the influence of the inter-mixture of races, and, with the education of ages, the growing ability of man to wield his power with better effect, concluding with a reference to medical science, and its probable influence upon the future of our race. A collection of flint implements and other vestiges of pre-historic man were exhibited by Mr. T. G. George, F.G.S. Mr. J. Gooch, M.A., was elected a member of the society.

## MAY.

A meeting on the 1st, in the Curators' room, when Mr. F. Law's meteorological reports were read. Mr. Elkington exhibited a case of lepidoptera from Zanzibar. The Rev. A. H. Cole-Hamilton, Captn. Gray, and Mr. G. Nichols were elected members.

At the meeting on the 15th, Mr. C. E. Crick brought forward the subject of the Society's herbarium, which is still in a very incomplete state, and it is hoped that members will assist in the work of completion. To this end, those willing to help are requested to bring their finds to any of the Tuesday meetings on the monthly notices. Mr. C. Law showed the Golden Saxifrage—chrysosplenium oppositifolium—from Stowe Wood. Mr. Kempson exhibited various microscopical objects.

At the meeting on Tuesday, the 29th. Mr. Beeby Thompson exhibited a large specimen of Helix pomatia, the celebrated Roman edible snail. This specimen had been found in a railway cutting near Banbury. Mr. F. Law's weather report for April was read. Mr. W. D. Crick gave a description of the interesting glacial drift deposits revealed by the cutting of the Wymington tunnel, and Mr. Crick, also Mr. T. G. George, exhibited a large number of fossils collected there from the drift.

## JUNE.

A meeting was held on the 13th, when the following were elected members :—Miss Baden, Miss C. Bailey, Miss Borton, Miss L. Shepherd, Dr. R. Greene, Messrs. Clifford-Cox, W. Morgan, and P. Komblau. Mr. West and Mr. Rush exhibited various specimens, and Mr. S. Law showed Cephalanthera grandiflora, from near Boughton.

On the 21st, there was an afternoon excursion to Althorpe Park, etc. About 18 members went—the unfavourable weather preventing a large attendance. Althorpe House was visited, and the party then proceeded to Brington to inspect the church, with its memorials of the Washington family ; and, after rest and tea at Mr. Parnell's Inn, returned home—some by road and others by rail.

A meeting was held on Tuesday, the 26th, when Mr. Beeby Thompson, F.G.S., described a large number of fossils from the Spinatus Zone of the Middle Lias, illustrating his remarks with numerous specimens. Mr. Crick also exhibited fossils. Mr. F. Law read his report for May. Mr. C. Markham exhibited a case of Indian Butterflies. Mr. West also contributed botanical specimens. Mr. Newman called attention to the numbers of very large mussels left exposed in the drained bed of the pond at Dallington. Mr. G. Longland was elected a member.

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# MIDLAND UNION OF NATURAL HISTORY SOCIETIES.

## TAMWORTH MEETING, JUNE 12TH, 1883.

## ADDRESS BY EGBERT DE HAMEL, ESQ.,

PRESIDENT OF THE UNION.

We have assembled this afternoon to celebrate the Sixth Annual Meeting of the Midland Union of Natural History Societies, an association which, as recorded on the first page and opening lines of the Union archives, derived its initiative, its first idea, developed in 1878, from the fact that early in 1874 the Tamworth Natural History, Geological, and Antiquarian Society held a very successful soirée, in which the Birmingham Natural History and Microscopical Society took a part. That Meeting (as the record further states) was in every way so satisfactory and gave such proofs of the value of co-operation, that many who attended it expressed a desire for more instances of a like kind, and thus we may fairly claim that to the local society (over which I have the honour this year to preside, and in whose name I now most heartily bid you welcome to Tamworth), the Union owes its birth, and it is pleasant to find that this body in its manhood is revisiting the scene of its infancy.

Then, as now, our near neighbour, the Birmingham Microscopical Society, came forward in response to an appeal for scientific assistance and placed a choice collection of their best instruments and most carefully selected objects at the service of those who attended and will attend our conversazione. So gratifying was the result, so agreeable the friendships then formed, that the original idea of co-operation has been followed up from this small nucleus until twenty-two societies, with an aggregate member roll of about 2,500 persons, all more or less bound together by the common tie of scientific pursuits, have joined its banner, and that admirable journal "The Midland Naturalist" (which deserves a higher appreciation and far wider circulation than I fear it enjoys) sprang into existence. Nor are these the only advantages that are to be derived from the Union, for at its Annual Meetings many men of similar scientific tastes are brought together and made acquainted. Dredging Parties under the auspices of the Birmingham Microscopical Society afford excursions on a princely scale, and ransacking the ocean's bed display to the enchanted participants an insight that it is impossible to overpraise into some of Nature's loveliest living objects; whilst smaller expeditions into the various districts over which the Union extends its branches (not the least important amongst which are those connected with our annual gathering), introduce those who are

energetic enough to attend to an immense variety of local objects of interest otherwise so difficult of access as to be passed unheeded. Not only so, but members of the various societies who have been at pains in the preparation of lectures, have redelivered their papers before other societies, and have thus been able, with but little extra personal exertion, to assist in extending the sphere of usefulness of the Union, help out the programmes of their neighbours (and all secretaries present will bear me out in saying how invaluable such assistance is), and finding their exertions on behalf of scientific knowledge not cast aside with the one occasion for which they were expended, have discovered in this an additional incentive to more earnest and better work than they might otherwise have deemed it necessary to employ.

Further than this, the Council of the Union, with a view to the encouragement of original research, provides an annual prize open for competition to every member of the affiliated societies, which consists of a medal (of the value of £10), struck in gold or bronze at the option of the successful candidate, and bearing the effigy of the late ever to be admired Mr. Charles Darwin, F.R.S., by whose permission (granted but a short time before he was personally lost to us) it is called the Darwin Prize. Founded in 1880 it was gained in 1881 by Edward Wilson, F.G.S., for Geology; in 1882 by Professor A. M. Marshall, D.Sc., M.A., M.D., of Owens College, Manchester, and W. P. Marshall, M.I.C.E., for a joint paper on Zoology, in which they give to science a vast amount of new and important information respecting the Pennatulida, and to these two last-named gentlemen, at the conclusion of my address, I shall have the honour of presenting the gold medal in the name of the Midland Union.

The subject selected for 1884 is Botany, and as the Union is rich in botanical specialists we may anticipate a keen and more than usually interesting contest.

These few remarks, scanty as I feel them to be, should suffice to indicate the value of the Union, and to induce the societies not yet enrolled and those individuals who have not joined one or other of the local societies, or subscribed to "The Midland Naturalist," at once to do so, not altogether for the mere personal advantages they may actually derive, but for the public good and the encouragement of an important and valuable method of promoting the most useful of all knowledge, that which is based on purely scientific principles.

I shall now, leaving the general objects of the Union, venture to draw your attention to its local aspect, especially as regards our present meeting place, "Tamworth," a spot that though it may be numerically small and insignificant is yet historically mighty and replete with a more than usual interest on account of the time over which its history extends, and the consequent changes and vicissitudes that, like the fleeting shadows of summer clouds, have darkened for a moment its prospects only to enhance the brilliancy of the sunshine which followed in their train. Situated on

a point of land overlooking extensive marshes, and placed at the confluence of two of Trent's most important tributaries, the rivers Tame and Anker—of which Drayton in his "Polyolbion" says

> "And likewise toward the north the lively tripping Rhea
> T' attend the lustier Tame is from her fountain sent;
> So little Cole and Blythe go on with him to Trent,
> His Tamworth at the last he in his way doth win,
> There playing him awhile, till Ancor should come in"—

Tamworth occupied the most important defensive position in the Forest of Arden, which anciently covered the whole of the district in which I should like to-day to interest you.

> "Muse, first of Arden tell, whose footsteps yet are found
> In her rough woodlands more than any other ground
> That mighty Arden held, e'en in her height of pride,
> Her one hand touching Trent, the other Severn's side."

And we shall point out to-morrow, on both excursions, venerable giant oaks that doubtless graced the glades of this quondam forest.

Our district is therefore bounded on the south by the Avon, on the west by the Severn, on the north by the Trent, and on the east by an imaginary line from High Cross (Bennones), to Branston (Ad. Trivonam), near Burton-on-Trent, and was the stronghold of the British tribe of the Cornavii which occupied the present counties of Warwickshire, Staffordshire, Worcestershire, Shropshire, and Cheshire.

Although we know but little about the Britons before the Roman invasion, we have good reason to suppose them to have been a powerful and wealthy people, deriving their riches mainly from the cultivation of corn, mining for lead and tin, and trading with the Phœnicians and other foreign nations; they were possessed of an excellent breed of horses, with an abundance of chariots, their country intersected with roads, or trackways, as the earlier writers termed them, the chief characteristic of which was that they followed the hill tops and avoided the marshes, throwing out branch roads at intervals to the adjoining villages or clusters of wattled beehive huts.

Amongst these roads the Gethling Street, or "Way of the Stranger," was one of the most important, and was afterwards taken possession of by the Romans and called "Watling Street," and we have therefore devoted our attention to it as the backbone of the Tamworth meeting.

The ancient British forts consisted of large mounds of earth surrounded with "foss and vallum" (ditch and embankment), the latter surmounted with a strong wooden palisade. Of these we can show a goodly number in the immediate district. First and most important amongst them as occupying the central and strongest position, situated at the confluence of the Tame and Anker, defended on the south by vast and impenetrable morasses, Tamworth stood, surrounded and supported within moderate distance by Seckington,

Castle Ring, at Beaudesert, Knave's Castle, Castle Old Fort, at Stonnall, Druid Heath, Barr Beacon near Sutton Coldfield, Castle Bromwich, and Oldbury.

Beyond these important places we find a large number of lows, barrows, and tumuli, which in almost every case occupy elevated and commanding positions, as those of you who accompany either of the excursions to-morrow will observe; not only so, but many of them were rendered sacred by use as places of sepulture, and were by this means protected from destruction. There is also no doubt that these spots were beacon stations from whence military signals were conveyed by a pillar of cloud, *i.e.*, smoke by day, and a pillar of fire by night.

Our townsman, Mr. A. A. Clarson, who has distinguished himself among scientific men as a most painstaking archæologist, in an excellent paper on the "Tumuli of the District" draws attention to this fact, and to the different classes of sepulchral pottery found in them when opened. These he divides into four kinds.

Cinerary urns and incense cups in the case of cremation, the urn for the ashes of the dead, the incense cup to carry the fire to the funeral pile.

Drinking cups and food vessels in the case of inhumation supposed to contain sustenance for the departed on the journey to the happy hunting grounds.

The local tumuli are at Hopwas Wood, Wigginton, Elford, Edingale, Croxall, Barrow Cop Hill, Bury Hill, Offlow, Hints, King's Standing, Windmill Hill, Maxtoke (3), Arley, Hartshill (2), and Cloudesley Bush, with doubtful ones at Polesworth, Stipershill, and Bramcote.

Several of these have been opened, that at Elford, in 1680, by Dr. Plot, who found it to contain ashes and burnt bones, whilst one of those at Hartshill was opened in 1773 and disclosed a pavement of brick about 6ft. square, which indicates the Romano-British period, as bricks were not used until after the Roman invasion.

In 1832 Mr. Mathew Bloxam opened the second tumulus near Hartshill Castle, and the dagger, cups, and vases of early pottery found there are now in his possession. Close by Croxall, in 1873, Sir Wilmot Horton found and presented to the Museum at Lichfield two Roman or Romano-British urns, containing bones, and one drinking cup. These were discovered at about 2ft. below the surface of the ground in a field at Oakley Farm.

In the year 55 B.C., Julius Cæsar crossing the Channel with a fleet of eighty ships and 10,000 men, landed in Britain on a flat part of the coast between Walmer and Sandwich, to avenge an attack that had been made on the Roman arms by a British force, he was met in battle by the Princes of Kent, whom he signally defeated, and having accomplished his object retired to Gaul.

But early in the next year, 54 B.C., he invaded Britain a second time and advanced as far as St. Albans, where a treaty was made with the British Chief Cassivelaunus, who, with 4,000 chariots, had stoutly opposed his advance, and Cæsar taking hostages again retired, in all

probability leaving behind him representatives, or, as we should call them, consuls, to look after Roman interests, and for whose safety the hostages were doubtless the guarantee.

It was ninety-seven years before the Romans reappeared, and during this period their agents had been diligently furthering Roman interests and developing the great thoroughfares of the country, three of which traverse our immediate district. They are the Watling Street, which runs from Richborough, on the coast of Kent, through High Cross, Manduessedum, Atherstone, Fazeley, and Wall, to Holyhead, in Anglesea, the great port for Ireland, sending a branch from near Chester, northwards to Scotland.

The Icknield Street, or "Road of the Iceni," proceeds from the coast near Great Yarmouth, by Royston, where it intersects the Ermyn Street to Dunstable, when it crosses the Watling Street and thence crossing the Thames passes by Bridport to the Lands End. This I mention in particular as the ordnance map places the Icknield Street between Birmingham and Wall, consequently this road, the Icknield Street, is erroneously connected with Tamworth, whilst it is the Rykenield Street, or road of the Upper Iceni, in which we are directly interested. This road connected Newcastle-on-Tyne, Chesterfield, Derby, Burton, Wall, where it crossed the Watling Street, the exact spot being indicated by three ancient stones, one in either hedge-bank and one in the middle of a field crossed by a footpath between the termination of the Watling Street at Barn End and the point by the Trooper at Wall, when the road recommences, with Sutton Coldfield, Birmingham, King's Norton, Tewkesbury, Gloucester, Chepstow, and Carmarthen, finishing at St. David's.

The Fosseway extended southwards from Lincoln to Leicester (in the museum of which town is a beautifully preserved Roman milestone) by High Cross, where it intersects the Watling Street, continuing past Brinklow, one of the finest earthworks in Warwickshire, and so on to Bath.

The Ermyn Street leads from the coast of Sussex to the south-east part of Scotland.

In A.D. 43, the Emperor Claudius decided on again invading Britain, and sent an army under Plautius for that object, who, after desperate fighting with Caractacus, became dispirited, and called on Claudius for assistance. The Emperor came with armed elephants and much pomp. In the meantime Caractacus had retreated towards the west, and although Claudius only stayed sixteen days, his visit had the desired effect, and reinspired the Roman army with courage. After a few years Caractacus was signally defeated at Caer Caradoc, in Shropshire, by Ostorius Scapula, and being betrayed by his mother-in-law, was handed over a prisoner to the Romans in A.D. 51.

The Romans now divided the country into five provinces, the central one called "Flavia Cæsariensis" extending from the Thames to the Humber, and so including Tamworth.

Nothing further that especially interests us occurred until A.D. 78,

when Vespasian confided the Government of Britain to Agricola, a man of great intelligence and determination, able and accomplished both as a warrior and statesman.

Agricola marched straight along the Watling Street to Anglesea, conquering or conciliating as proved necessary, as well as teaching the civilisation enjoyed by Rome. Under his administration the condition of Britain, much as it had improved during the past century, made vast onward strides. He it was who planned the chain of forts on the Watling Street (two of which you will inspect on your excursions to-morrow), established garrisons throughout the country, and built many of the substantial stone houses, the solid foundations and tesselated pavements of which are so often discovered beneath the level of the ground in many parts of the country.

In 180 Christianity was, at the instigation of the British King Lucius, introduced into Britain by Pope Eleutherius.

A century later, in the year 300, Emmenius describes "Britannia as fortunate and happier than all other lands, enriched with the choicest blessings of heaven and earth."

The year 418 saw the last of the Romans in Britain, and we learn a singular fact from the Anglo Saxon Chronicle, which is corroborated by the constant finds of coins and pottery in this neighbourhood and elsewhere. "That this year the Romans collected all the treasures that were in Britain, and some they hid in the earth, so that no one has since been able to find them, and some they carried with them into Gaul."

Before leaving the Romans I would especially call your attention to the bold and skilful manner in which they planted their stations and camps in the very midst of those belonging to the Britons, and how occasionally they invested particularly strong positions such as Seckington, with a camp, at Thorpe Constantine, Oldbury, with one at Park Place, and Tamworth with another at Wigginton.

In 450, Hengist and Horsa, two Saxon chiefs, commenced the invasion of Britain that led to its subjugation by the Saxons, and we pass over another 135 years, until in 585 Creoda led his followers into the district of Arden, overran the Midland Counties, and founded the Kingdom of Mercia, which comprised all the territories south of the Humber, east of the Severn, north of the Thames, and west of a line drawn through the counties Herts, Beds, Cambridge, Hants, and Lincoln.

The next great historical event was the coming of Augustine in 597.

In 627 the terrible heathen Penda began to reign, and conquered in succession two of his Northumbrian rivals; but in 655 was at the age of eighty finally slain in battle by Oswin, of Northumberland, who thus obtaining Mercia converted it to Christianity, and it was at once put under the spiritual charge of a bishop. In 667 Ceadda (St. Chad), fifth Mercian Bishop, fixed his See at Lichfield.

Mercia soon after this regained her military supremacy.

Some of the Saxons settled at Campus Martius of the Romans near to the Watling Street, and called it Arden's Hill, now Hartshill; another Saxon town was formed near the Castra Æstiva or summer camp, Ealdburie, now Oldbury, whilst a little to the north they founded Arden's town, now Atherstone.

During the reign of Ethelbald, which extended from 716 to 756, Mercia obtained great power, the most important events being the constant battles for supremacy with the West Saxons, and this brings us to the great battle of Seckington, near Tamworth, between Ethelbald and Cuthbert, King of the West Saxons, during which Ethelbald was slain by the traitor Beornred, who in turn was put to death by Offa, the succeeding King of Mercia, and he victorious over all enemies within his own island, corresponded on equal terms with the great Charles, the mightiest potentate of the east.

Soon after his accession to the throne Offa came to Tamworth, where he caused a palace to be built of greater dimensions than was usual in those times, which was the admiration and wonder of the age.

He also strongly fortified the town by surrounding it with a vast entrenchment and bank, which we still call Offa's Dyke or the King's Ditch, and the town became one of great celebrity, a favourite resort of Offa and his successors, from which they dated charters to the bishops and religious bodies of the realm.

Tamworth enjoyed with other great places the privilege of coining from the time of Offa until the reign of Henry I.

Offa died on the 18th of August, 794. From this point we find Tamworth mentioned in charters of various Mercian Kings until we reach the year 852, when Burgred the twentieth King of Mercia, and last recorded as being at Tamworth, succeeded and enjoyed a period of profound peace for fourteen years.

After this the Danes invaded the kingdom, two years later having established themselves in the north they descended on Mercia and took Nottingham, where Burgred beset them; but unable to maintain the siege had to allow them to march back to Northumbria. They poured into the country again in 874, and destroyed the Mausoleum of the Mercian Kings at Repton, in Derbyshire. Burgred, worn out fled, and Mercia, as a kingdom, after 292 years ceased to exist. The Danes spreading through the land destroyed the principal towns and fortresses, amongst them Tamworth, which, completely razed to the ground, lay a mass of blackened ruins for nearly forty years.

In 880 Nemesis (in the person of King Alfred) overtook the marauders, their raven banner was struck down, and after a bloody engagement the survivors were spared only on the condition that they embraced Christianity and helped to repel a further invasion by their countrymen.

King Alfred not only overcame the Danes but legislated wisely for the country, dividing it into counties and hundreds, the Tamworth district being within the counties of Warwick and Stafford, and comprising the hundreds of Hemlingford,—named from the ford at

Kingsbury, five miles south of the town,—and Offlow from the tumulus of that name near to Lichfield.

Alfred died in 901, leaving behind him a daughter "Ethelflæda," who was known as the "Lady of the Marches," and inherited qualities that fitted her to take part either in state councils or in war; she made it her greatest care to restore the principal towns and fortresses which had been destroyed by the Danes, and marched to Tamworth with her whole army in the early part of the summer of 913, caused it to be rebuilt, restored the castle and all the fortifications, and raised a strong keep or dungeon upon a partly artificial mound on which the present edifice has been built in later times, and Tamworth once more regained its former celebrity and importance.

Ethelflæda died in 920, and was succeeded by her daughter Alfwin, who was deposed in about six months by Edward the elder. On this, Tamworth, with Nottingham, Derby, and some other towns, rose in Alfwin's favour, Edward was forced to take arms against the insurrection, and first marching upon Tamworth subjugated it. He died in 924, and was succeeded by Athelstan, who gave his sister Editha to the Danish King Sihtric on the condition that he embraced Christianity, and their marriage was celebrated at Tamworth, on the 30th of January, 925. Sihtric died soon after, and Editha, retiring from the world, became Abbess of a Nunnery which she founded at Tamworth, the Castle of Tamworth in the county of Warwick being given to her by her brother.

In 941 Anlaf, a son of Sihtric, anxious to regain Northumbria conquered York, and advancing rapidly to Tamworth stormed and took it with great slaughter, and carried away much plunder. From this time Tamworth ceased to be a Royal residence and sank into comparative obscurity, and at this point we cannot do better than glance for a moment at the ecclesiastical history of the district. As already stated, St. Chad, fifth Bishop of Mercia, fixed his See in 667 at Lichfield, that field of the dead where unnumbered martyrs had shed their blood for Christ in the Diocletian persecution. Within a hundred years, *i.e.* by 770, Palmer states there must have been a Church at Tamworth.

About 820 Egbert (so the legend recorded of him says) had a son, a leper, who, by advice, was sent to Ireland and cured by a Nun named Modwenna, a daughter of the King of Connaught, and so grateful was the King that he offered to found a religious house for her and her nuns in England. This offer was accepted, and Modwenna established at Trensale, a village opposite Polesworth.

A few years later Egbert, whose daughter Editha had been placed under Modwenna's care for religious instruction, built the nunnery at Polesworth and made Editha the first abbess, Modwenna retiring to the chapel of Andressy, near Burton-on-Trent, in whose abbey she was subsequently buried.

Following on in chronological order we find the church at Tamworth entirely destroyed in 874 by the Danes, and we hear of it

again in the reign of Edgar the peaceful, who founded it afresh in or about 963, after the direful sacking of the town by Anlaf, and consecrated it to his beatified aunt Editha.

Between 975 and 1016 we find it recorded that there was a monastery at Tamworth. A Royal Mint existed here from the time of Offa. Ruding describes a penny of Edward the Martyr bearing the name of the town abbreviated to "Tanwo.," and here I may fitly quote Bartlett, who in his Manduessedum Romanorum, page 19, says "In the year 781 Offa issued a charter to the monks of Worcester, dated from his Royal Palace at Tamworth."

At Kingsbury, also a royal seat, Burtwulf held in 851 a grand Baronial Council, at which were present the temporal Barons, the Pope's Legate, one Archbishop, six Bishops, and three Abbots.

And he adds "we may conclude that as Tamworth was at that time the Mercian capital, and as all these Princes coined money, and some in large quantities, that certainly a mint was established in this town."

A discovery of coins which created considerable sensation at the time was made in Tamworth in 1876, on the site of the board school and just within the ancient earthworks, amongst which were thirty-three Tamworth specimens of William I. and II., bearing the minters' names—viz., Brunic and Coline,

BRVNIC ON TAMP,
CVLINE ON TAMP,

whilst in the reign of Canute, who died in 1035, coins were issued by a moneyer of Tamworth, stamped Edric on Tam.

We now pass on to 1066, when William the Conqueror took possession of the country and rewarded his nobles by presenting them with the captured districts, amongst them was Robert le Marmion, Lord of Fontenaye, near Caen, who received for his share lands in Warwick, Leicester, and Lincoln, comprising the Castle of Tamworth, with the lands round about, which included Polesworth and Stipershill, the rising ground adjacent, on which was held the three weeks' court leet of the lords of Tamworth Castle.

Sir Robert Marmion soon after expelled the nuns from Polesworth and forced them to take refuge in a cell close to Oldbury, but, conscience-stricken, dreamt a dream, in which the saintly Edith appeared at his bed side and struck him with her crozier; repenting his haste he rode over to Oldbury and escorted them back with all honour, stipulating only that he should have burial within the chapter house of the Abbey.

Round about the Polesworth side of Tamworth we find a considerable number of localities associated with the ecclesiastics. On the right hand side of the Amington Road, immediately after the first canal bridge is passed, is the only remaining portion, some half mile in length, of a raised and paved monk's walk, or pack-horse road; this has been considerably reduced at the Amington end within my

knowledge, and bids fair soon to disappear. Some two miles further is Alvecote Priory, an interesting spot with ruined remains of a chapel wall in the garden, curious cellars and ancient stone dovecote. This was a small monastery erected in the reign of Henry II. by a Burdett in expiation of the murder of his wife, and legend states that it was built of the stone ruins of the castle that formerly stood on Seckington Mount about three miles to the north of it. A stone coffin, probably containing the body of an abbot, was discovered opposite the Priory when the Coventry Canal was cut, this was reburied in the garden, but, unfortunately, no record kept of the exact place. Earthen pots containing bronze Roman coins were found here in 1763, 1840, and 1871.

A mile south of Alvecote, on the site of St. Edith's Well, stood the hermitage with its series of fishponds, and near Polesworth, overlooking the River Anker, is an interesting old house, Elizabethan in structure, called Pooley Hall.

A short distance beyond Polesworth is Merivale Abbey, founded during Stephen's reign in 1148 by Robert de Ferrers for a Cistercian Monastery, and the charter was confirmed at Tamworth about the year 1154 by Henry II. in the presence of Theobald, Archbishop of Canterbury.

Returning to Tamworth we find that there was a Hospital of Monks of the Premonstratensian order founded in 1287 by Philip Lord Marmyon, the remains of which (a small chapel and cloister) still exist on the north side of the town.

In 1345 the town was again destroyed by fire, and the church in particular suffered severely, but was immediately rebuilt in all the splendour which characterised the work of the fourteenth century.

About 1466, in the reign of Edward IV., an amusing incident occurred on an unenclosed heath between Sutton Coldfield and Drayton Bassett, when the King, whilst on a hunting expedition, encountered the "Tanner of Tamworth," and after some pleasant banter, exchanged horses with him. The celebrated ballad describing this is preserved amongst the Percy Reliques.

We now reach perhaps the most important local historical event connected with Tamworth, *i.e.*, the great battle which was decided at Bosworth Field, between Richard III. and Henry, Duke of Richmond (afterwards Henry VII.), on the 22nd of August, 1485.

On the 16th, Richard, mounted on "White Surrey," marched with 12,000 men from Nottingham to Leicester, and passed the night at the "White Boar" in Northgate Street. The next day he proceeded towards Atherstone, and took up an admirable position at Stapleton, placing his artillery on the heights now called Dickon's Nook, near Sutton Chainel. The Duke of Norfolk stationed his forces to the north at the Duckery, near Market Bosworth, whilst the traitors—Lord Stanley and Sir William Stanley—encamped, the former south of Richard near Dadlington, and the latter outflanking his chief at Far Coton, west of the Duke of Norfolk.

Richmond landed at Milford Haven on the 6th of August, and marched through Shrewsbury and Stafford (where he had an interview with Sir William Stanley) to Lichfield, he there encamped outside the walls, and next day entered the city in triumph; on the 18th he came down with his army to Tamworth, being reinforced on the way by Sir Walter Hungerford and Sir Thomas Bouchier, who had deserted from Richard. At Coton Turn, close by Hopwas Bridge and about 1½ miles from Tamworth, Richmond missed his way and wandered towards Elford, his absence caused great uneasiness and consternation among his troops, but with the morning light he rode into Tamworth and passing up and down the lines reassured his followers. On the next day, the 19th, he pushed on with twenty men through a forest of Arden byeway, past Merivale Abbey to the outwoods at Atherstone, where in a meadow known as the Hall Close he met the Stanleys by appointment and finally arranged with them the traitorous plan that overthrew Richard. The Duke of Richmond's army followed him from Tamworth and passed along the Watling Street through Atherstone and Manduessedum to the Fenn Lanes up which it proceeded to the White Moors near Shenton Windmill.

You all know how Richard, betrayed on all hands and finding the battle going against him, drank at the well which still bears his name, then battle axe in hand bore down on Richmond in order to settle the conflict by a personal duel; however just as Richmond was in great danger from this sudden onslaught White Surrey stumbled and Richard fell—never to rise again.

On the parapet of the tower of Tamworth Church, which is approached by the curious and unique double winding staircase, are two flat battlements, upon the east side and direction of Bosworth. It is supposed that these carried a mass altar on which Henry VII. had service performed every 22nd of August to commemorate the two incidents I have described—his separation from his army on the 18th, and his subsequent victory.

In 1535 Henry VIII. determined on the dissolution of the monasteries, and among them ordered an inspection of Polesworth Nunnery, which had become the school for all young ladies of position in the Midlands, and bore so excellent a character that it was allowed three years' grace, and was not finally dissolved until January 30, 1539.

The Ghost Chamber in Tamworth Castle owes its origin to this proscription of the Roman Catholics, who, compelled to practice their religious exercises surreptitiously and under heavy penalties, arranged their chapels so that in case of alarm the officiating priest should have ample means of escape, and the vanishing vestments of the ghostly fathers, if anyone approached, naturally constituted an admirable and well conducted spirit.

But we must hasten on to 1643 when Charles I., at war with the Parliament, was engaged in civil strife, in which Tamworth again played an active part, and the Castle was occupied by the King's party,

who also under Sir Richard Dyot were defending Lichfield Cathedral, a strong fortification, from the Parliamentarians under Lord Brook, who was killed by a bullet from the tower of the Cathedral while directing the siege, the spot being now marked by a brass plate and inscription; the Lichfield Royalists were, however, defeated, and the Republicans for some time, although in possession of the Close, were much annoyed by the garrison at Tamworth Eventually the Castle was, after two days' siege and a stout resistance, captured by Colonel Purefoy, and the command of it given by the Parliamentarians to Captain Waldive Willington.

Meanwhile the Royalists recovered Lichfield, and the two towns continued in a state of hostility until the Lichfield Royalists had again to capitulate, and Tamworth, having no longer any adversaries to contend with, assumed its usual peaceable condition, and henceforth all interest centred in the town is of a political and commercial character.

During the decade terminating with 1671 several tokens were struck and issued by tradesmen in the town.

Tamworth had been disfranchised by Cromwell, but recovered its political privileges in 1660, sending two members to the Rump Parliament, and this it has continued to do ever since.

From this point the only events worth comment are the introduction of Canals in 1788, of Gas in 1835, and Railways in 1839, together with the Queen's visit to Drayton Manor, the seat of the then Premier, Sir Robert Peel, in 1843.

I must apologise to the lovers of pure Natural History for not dealing with the birds, beasts, and plants, of the locality, and to the students of Geology for neglecting their especial branch; but I may tell the latter that the district is divided by a notable fault running north and south from Dosthill, that the Hartshill excursion will be on the coal measures and Cambrians, whilst the one to Lichfield will be over the Triassics.

Thanking you for the attention you have given to what I am perfectly conscious is a very feeble effort, I shall conclude this perhaps too tedious summary of Tamworth's history in which I have endeavoured chiefly to interest you in those points which will come under your notice during the excursions or at the conversazione, by quoting the poetical prediction, that :—

"When in its banks no longer flows
The Anker's clear and sparkling stream;
And Tame withholds its gentle course,
Thy memory Tamworth, as a dream
Shall, by tradition's voice alone
Then be told—
Thy place forgotten, but as one
Once of old."

# THE FLORA OF NORTHAMPTONSHIRE.

*(Continued).*

By G. C. Druce, F.L.S.

811. Jasione montana, L. Sheep's Bit. Native. Sandy soil. Very local and rare.

Nene a, Borough Hill (W. L. Notcutt), Newnham Hill (T. Beesley). Top. Bot. 32 Northampton.

814. Campanula glomerata, L. Clustered Bell Flower. Native. Calcareous pastures, etc. Rather rare.

Cherwell, Culworth (Morton); Ouse, Ashwell (Miss Scott), Cosgrove Quarries, Coppice Moor; Nene a, Boughton, Roade; Nene b, Yardley Hastings (Rogers), Grendon (Miss Brent), Weldon (Lewin); Nene c, Southorpe (W. H. Jones), Barnack (Morton), Apethorp (Berkeley), Peterboro' (Paley), Wittering; Welland, Wothorp (Morton), Ufford (W. H. Jones), Collyweston, Easton-on-the-Hill.

815. Campanula Trachelium, L. Nettle-leaved Bell Flower. Native. Hedge sides and open woods on limestone. Local.

Ouse, near Towcester; Nene a, Blisworth, Roade; Nene b (Easton Wood (Miss Brent), Weekly Wood (Lewin), Yardley Chase (Rogers), Brigstock; Nene c, Peterboro' (Paley); Welland, Fineshade (W. Lewin).

816. Campanula latifolia, L. Throat Wort. Native. Old hedge sides, woods. Very rare.

Cherwell, near Middleton, rare (Mr. Jessop). Mr. Beesley informs me it is not wild at Middleton. Charwelton (Baker's Hist.) Mr. Walford says in 1876 it was extinct. Ouse, near Tiffield; still plentiful along one hedge side, probably at a distant date included in woodland. Nene a, near Thrupp Farm (W. L. Notcutt); Nene b, Cransley Wood (Walker's Flora of Oxford), Orlingbury Lane (W. Lewin).

Some plants of this species occurred as casuals on the borders of Harleston Heath.

Scott alludes to "the throat wort with its azure bells.

[817. Campanula rapunculoides, L. Alien, waste ground, Dallington].

818. Campanula rotundifolia, L. Harebell. Native. In all the districts and generally distributed, except on clayey soil and in low meadows.

A favourite flower with the poets:

"And lovely harebell quaking on the heath."—HOOD.

"As blue I trow
As is the harebell that adorns the field."—SHENSTONE.

"Raised its head
Elastic from her airy tread,
For me she stoop'd, and looking round,
Plucked a blue harebell from the ground;
This little flower that loves the lea
May well my simple emblem be."—SCOTT.

820. Campanula Rapunculus, L. Rampions. Only old localities; some probably should be referred to *C. patula*.

Ouse, Whittlebury Forest (Morton); Nene a, Badby Woods (Morton), Weedon (Baker); Nene c, Peterboro' (Paley).

I have searched all these unsuccessfully.

821. Campanula patula, L.

Nene a, Farthingstone, Castle Dykes (Baker's History).

On two occasions I searched without success for this plant.

822. Specularia hybrida, A.D.C. Venus' Looking Glass. Colonist Cultivated fields. Locally abundant.

Cherwell, Grimsbury (Beesley), Aynhoe, etc.; Avon, Yelvertoft; Nene a, Kingsthorpe (Sir Jno. Robinson), Harleston, Duston, Roade, Eastcote, Gayton; Nene b, Whiston, Castle Ashby (Rogers), Kettering (Lewin), Irthlingboro', etc.; Nene c, Peterboro' (Paley), Wansford (W. H. Jones), Barnack, Wittering, etc.; Welland, Fineshade (Lewin), Laxton, Wakerley (W. H. Jones), Collyweston (Burlegh.)

ERICACEÆ.

836. Erica Tetralix, L. Cross-leaved Heath. Native. Almost if not quite extinct.

Nene a, Harleston Heath (Baker), extinct; Nene c, Peterboro' (Paley). Mr. Bodger tells me it still occurs; whether the present locality is really in Northants is not absolutely clear.

837. Erica cinerea, L. Heather. Native. Local and rare. Dry heaths.

Nene a, Harleston Heath (Baker), still there, occasionally with white flowers; Nene c, Duddington Wood (Lewin), Peterboro' (Paley).

"On the wild hill
Let the wild heath bell flourish still."—SCOTT.

"The wild heather bells
Ring Sabbath knells."—HOOD.

"Feeding mid purple heath."—WORDSWORTH.

"Those wastes of heath
Stretching for miles to lure the bee,
Where the wild bird on pinions strong
Wheels round and pours his piping song,
And timid creatures wander free."—MARY HOWITT.

[838. Erica vagans, L. In Harleston Heath (Baker's History). If really that plant it must have been introduced, as it is wild only in Cornwall].

840. Calluna vulgaris, Salisb. Ling. Native. Very local.

Nene a, Boro' Hill (Notcutt), Harleston Heath (Baker), Kingsthorpe Bushes, and with white flowers, Badby Woods; Nene b, Overstone (Mrs. Birch); Nene c, Bedford Purlieus (W. H. Jones), Peterboro' (Paley).

This Ling is not recorded for Northampton in Cybele. Brit.

[Northamptonshire is one of the very few counties from which the Bleaberry—*Vaccinium Myrtillus*—appears to be absent].

846. Monotropa Hypopitys, L. Yellow Bird's Nest. Native. Woods. Very rare.

Castle Ashby, Aug. 2, 1873 (Miss Brent).

JASMINACEÆ.

847. Fraxinus excelsior, L. The Ash Tree. Native. Woods and hedges. Common.

The great ash tree at Cranford has been well illustrated in this Journal, vol. i., pp. 169.

"The ash," says Gilpin in his Forest Scenery, "generally carries its principal stem higher than the oak, and rises in an easy flowing line. But its chief beauty consists in the lightness of its whole appearance. Its branches at first keep close to the trunk, and form acute angles with it; but as they begin to lengthen, they generally take an easy sweep, and the looseness of the leaves corresponding with the lightness of the spray, the whole forms an elegant depending foliage."

"The ash for nothing ill."—SPENSER.

"Fraxinus utilis hastis."—OVID MET.

"And ash far stretching his umbrageous arms."—COWPER.

"As the tender ash delays to clothe herself
When all the woods are green."—TENNYSON.

"As black as ash buds in the front of March."—TENNYSON.

In the north of England and Scotland the ash is a much more prominent feature in the landscape than in the southern counties.

"Oh! the oak, and the ash, and the bonnie ivy tree,
Oh! they flourished best at hame in the north countrie."

Shakespeare only makes one allusion to it.

848. Ligustrum vulgare, L. The Privet Tree. Probably native. Wood, thickets, hedges, etc.

Cherwell, Grimsbury (French), Evenley, Charwelton; Avon, Staverton (Notcutt); Ouse, Grafton Regis, Stoke Bruerne; Nene a, Roade, Harleston, Brampton; Nene b, Ecton, Rushton, Castle Ashby (Rogers), Horton (See Museum Herbarium); Nene c, Peterboro' (Paley), Wittering; Welland, Rockingham.

Often used to make garden hedges, for as Ray says, "inter omnes frutices, orbores et herbas nihil est quod in tot figuras et elegantias, effingi, flecti, aut formari tondendo queat ac Ligustrum."

"As clean and white as Privets when it flowers."—TENNYSON.

APOCYNACEÆ.

849. Vinca major, L. The Great Periwinkle. Denizen: Hedge, canal sides, etc.

Ouse, Yardley and Grafton, garden escapes, but quite naturalized and wild looking by the canal side between Stoke Bruerne and Grafton; Nene a, hedge between Hunsbury Hill and Milton. Floore, escape, Wootton, ditto, Weedon; Nene b, Buttocks Booth, Slipton, Castle Ashby; Nene c, Southorpe (Morton's Nat. Hist.)

"A garland of Pervenke set on his head."—CHAUCER.

850. Vinca minor, L. The Small Periwinkle. Denizen: hedges.

Cherwell, Warkworth (French); Nene b, Overstone (Mrs. Birch), Castle Ashby, Harrowden, Wellingboro'; Nene c, Milton Woods (Paley).

This seems to be less a naturalized than the preceding species.

"Through primrose tufts in that sweet bower
The fair Periwinkle trailed its wreaths,
And 'tis my faith that every flower
Enjoys the air it breathes."

GENTIANACEÆ.

853. Erythrea centaurium, Pers. Centaury. Native. Dry calcareous ground. Local.

Cherwell, Newbottle (Beesley); Ouse, Wappenham (Miss Scott), Whittlebury Forest; Nene a, Harleston and Dallington (Baker)—still frequent; Welton road (Notcutt), Brixworth, Badby Wood, Duston to Harpole, Farthingstone; Nene b, Yardley Chase (Miss Brent), Great Billing (Baker), Thorpe Malsor (Morton), Denton, Easton Wood (Rogers), Wittering

Heath; Welland, Helpstone Heath (Paley), Wakerley Wood (W. H. Jones), Newton, Collyweston.

The plant is extremely bitter and has long been in use on account of its tonic properties.

Gerarde attempts to versify in its praise :—

"My floure is sweet in smell, bitter my juice in taste,
Which purge choler, and helps liver that else would waste."

854. Erythrea pulchella, Fries. Native. Dry heathy place. Rare.

Cherwell, Newbottle (French); Nene c, Bedford Purlieus (H. Jones), Peterboro' (Paley).

857. Chlora perfoliata, L. Yellow Centaury. Native. Calcareous soil. Rarely on drift clay. Rare and almost confined to the east of the county.

Nene b, Castle Ashby (R. G. Scriven, Esq., Miss Brent, Miss Davison, Mr. Rogers, etc.), Thorpe Malsor (Morton); Nene c, Thornhaugh (Rev. M. J. Berkeley), Southorpe (W. H. Jones), Weldon (Lewin), Southorpe Quarries, Ufford rail banks; Welland, Fineshade and Deene (Lewin).

Like most of the Gentianaceæ this plant is bitter in taste and possesses tonic properties.

861. Gentiana Amarella, L. Autumnal Gentian. Native. Calcareous pastures. Rare.

Cherwell, Cottisford Heath (French), Newbottle (Beesley), Croughton. Apparently absent from the Ouse district, but should occur near Brackley. Nene a, Blisworth, calcareous field bordering Plain Woods, near Roade; Nene b, Cransley, Loddington (Morton), Field near Easton Wood (Miss Brent); Nene c, Weldon (Lewin), Wittering (Jones), Southorpe (Bodger), Old Oundle Road, pit and waste ground in Low Wood at junction of Wansford and King's Cliffe road (Jones); Welland, Easton (Morton), Stanford (Bodger), Fineshade (Lewin), Helpstone Heath (Paley).

862. Gentiana campestris, L. Field Gentian. Native. Extremely rare—occurring in a few localities about Stamford.

Nene c, Southorpe (Bodger). I have not seen specimens from this locality and it should be re-affirmed. Welland, Easton (Morton), lane east side of Bedford Purlieus (Jones). This may possibly be in the Nene drainage. Stamford (Bodger).

863. Menyanthes trifoliata, L. Buck Bean. Native. Bogs and shallow ponds. Rare and decreasing.

Cherwell, Croughton Bog (French); Ouse, Maidford (Rogers), Lois Weedon (Gulliver); Nene a, Harleston (Baker), Gayton; Nene b, Great Billing (Baker); Nene c, White water side (Jones), Marsh by the White water side where the road from Barnack to Wansford crosses the ford—plentiful and in fine flower.

This very beautiful plant has been often employed for its tonic properties.

864. Limnanthemum nymphœoides, Link. Native. Still water. Very rare.

Nene c, River opposite Standground (Morton, Paley).

One of our most beautiful aquatics.

POLEMONIACEÆ.

865. *Polemonium cæruleum*, L. Jacob's Ladder.

Mr. W. H. Jones informs me he found this plant by a brook side between Kirby Hall and Deene Wood; of course the plant was not native there.

CONVOLVULACEÆ.

866. Convolvulus arvensis, L. Bindweed. Cultivated fields, hedges, waste ground. Very common and generally distributed throughout the county.

There are two forms, one with narrow the other with broad leaves.

"Fragile bind weed bells."—TENNYSON.

867. Convolvulus sepium, L. Great Bindweed. Wild Convolvulus. Hedges, thickets. Rather common.

Cherwell, Aynhoe; Avon, Yelvertoft; Ouse, Grafton Regis; Nene a, Horton (Mus. Herb.), Dodford (Notcutt), Newnham; Nene b, Delapre, etc.; Nene c, Milton (Paley), Barnack; Welland, Easton.

The handsome white flowers of this species are a great adornment of many of the hedgerows of Northamptonshire.

Wordsworth rather disparages it, for he says—

"The cumbrous bindweed with its wreaths and bells
Had turned about her two small rows of peas
And dragged them to the earth."

George Eliot gives it the meed of praise it deserves when she describes one of the Midland hedgerows "with its wild convolvulus climbing and spreading in tendrilled strength till it made a great curtain of pale green hearts and white trumpets."

869. *Cuscuta Epilinum*, Weihe. Flax Dodder.

Alien, Thornhaugh.

# A LIST OF THE BIRDS OF THE BANBURY DISTRICT.

By F. C. Aplin, B.C.L., Rev. B. D'O. Aplin, B.A., and Oliver V. Aplin.

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1.—Falco peregrinus. *Tunstall.* Peregrine Falcon. An occasional visitor in autumn and winter, chiefly young birds on the autumn migration. We know of four occurrences within the last three years.

2.—Falco subbuteo. *Linn.* Hobby. A rare summer visitor. In the *Zoologist* for 1881, p. 493, we have recorded eggs of this bird in our collection taken at Claydon in 1876, and a young bird taken from a nest in some high trees at Huscot Mill in the summer of 1879, and which we had in our possession for nearly a year and a half. Mr. H. Holbech informs us that a pair were observed in Mollington Wood in the spring of 1880.

3.—Falco æsalon. *Tunstall.* Merlin. A rare autumn and winter visitor; one or more are however procured every season. We have in our possession a young bird killed at Overthorpe on the 18th October, 1879, and an adult male in fine plumage, killed at Gaydon, Warwickshire, in the autumn of 1880.

4.—Tinnunculus alaudaria. *Gmel.* Kestrel. Common and resident, but not so frequently seen in winter as in summer.

5.—Astur palumbarius. *Linn.* Goshawk. Mr. Prior, in an account of the birds of North Oxon, published in a local paper a few years ago, says:—"I have in my possession a fine male Goshawk, shot near Wroxton." In a letter to us he remarks that Oxfordshire Goshawks are very large female Sparrow hawks, and with this opinion we must agree.

6.—Accipiter nisus. *Linn.* Sparrow Hawk. Resident and fairly common, but not so much so as the Kestrel.

7.—Milvus ictinus. *Savigny.* Kite. In the "History of Banbury" list this bird is mentioned as "rare, much more common a few years ago." It is now quite extinct, and we have no recent occurrence on record.

8.—Buteo vulgaris. *Leach.* Common Buzzard. One was shot at Edgcote a few years ago. It is included in the "History of Banbury" list as "rare" on the authority of Mr. Jessop

9.—CIRCUS CYANEUS. *Linn.* Hen Harrier. This species is included in the "History of Banbury" list. We have no recent record of its occurrence.

10.—SYRNIUM ALUCO. *Linn.* Tawny Owl. Resident and common, especially in thick fir plantations.

11.—ASIO OTUS. *Linn.* Long-eared Owl. Resident. Mr. Prior informs us that it bred in a small covert near Deddington. It is more common in autumn and winter.

12.—ASIO ACCIPITRINUS. *Pall.* Short-eared Owl. An autumn and winter migrant. We have observed them, while waiting for ducks in the valley of the Cherwell, coursing over the meadows in the twilight, and have put up as many as three together from rough grass in a marshy meadow while snipe shooting. This species is not strictly nocturnal.

13.—STRIX FLAMMEA. *Linn.* Barn Owl. Resident and common. Notwithstanding all that has been written on the subject we believe that this bird *does* hoot as well as screech, but while the hoot of the Tawny Owl may be syllabled "ho - - - - oo - oo - oo" the cry of the Barn Owl is more accurately represented by "ho-o-o-o-o-o-o," the first short sharp "hoot" being wanting.

14.—LANIUS EXCUBITOR. *Linn.* Great Grey Shrike. A rare winter visitor. About twelve years ago two were killed in March at Hook Norton. One was shot at Hempton in 1844. In 1879 two were procured near Banbury. We examined one of these, in the stomach was the remains of a shrew; this bird is now in our collection.

15.—LANIUS COLLURIO. *Linn.* Red-backed Shrike. A rare summer visitor. We have a pair of birds and also the eggs in our collection from the district. In 1879 a pair nested near the brickyard on Constitution Hill, and we have heard of a few other instances, but the bird is seldom met with.

[LANIUS AURICULATUS. *Müll.* Woodchat Shrike. This species is included in the "History of Banbury" list on the authority of Mr. Loftus, with the remark "Not found now." It is doubtful whether it ever occurred.]

16.—MUSCICAPA GRISOLA. *Linn.* Spotted Flycatcher. A summer migrant and common.

17.—ORIOLUS GALBULA. *Linn.* Golden Oriole. We believe an example of this species was procured at Whichford. Early in May, 1880, as we have recorded in the *Zoologist* for that year, p. 259, two male birds were shot in a wood at Great Tew and brought to Mr. Wyatt. The man who shot them said they were *carrying grasses up into a tree and hanging them over the branches.* It is probable that the hen birds were there also but were not noticed from their comparatively sombre plumage. Possibly they intended nesting. These are now in our collection.

18.—CINCLUS AQUATICUS. *Bechst.* Dipper. A specimen is recorded from Claydon in 1874, having flown against the telegraph wires. In the *Zoologist* for 1882, p. 150, we have recorded a nest of the bird together with the eggs and old birds in the possession of Mr. M. George Hitchcox, of this town. The nest was found near Claydon, built in the stump of an old thorn bush on the banks of the river.

19.—TURDUS VISCIVORUS. *Linn.* Misseltoe Thrush. Resident and common; more numerous in early autumn when migrants appear in small flocks, which are often mistaken for early Fieldfares. We have seen this bird in the breeding season drive off both the Rook and the Brown Owl.

20.—TURDUS MUSICUS. *Linn.* Song Thrush. Resident and common. More numerous during the autumn migration when they stay for a short time, frequenting gardens and feeding on the yew berries.

21.—TURDUS ILIACUS. *Linn.* Redwing. A winter migrant arriving often in large numbers. Being more insectivorous than the next mentioned species, they suffer more from a severe frost.

22.—TURDUS PILARIS. *Linn.* Fieldfare. A winter migrant. In some years they appear in very large flocks, in others we get but few. They arrive about the second or third week in October, and have been known to stay as late as the middle of May. In 1880 we saw a small party on the 9th of that month.

23.—TURDUS MERULA. *Linn.* Blackbird. Resident and common.

24.—TURDUS TORQUATUS. *Linn.* Ring Ouzel. A rare visitor, generally in spring. An immature bird was shot a few years ago near this town. We have in our collection a fine male example killed at Epwell on the 26th April, 1880.

25.—ACCENTOR MODULARIS. *Linn.* Hedge Sparrow. Resident and common.

26.—ERITHACUS RUBECULA. *Linn.* Redbreast. Resident and common.

27.—DAULIAS LUSCINA. *Linn.* Nightingale. A summer visitor. Formerly common but less so of late years.

28.—RUTICILLA PHŒNICURUS. *Linn.* Redstart. A summer migrant and fairly common. Nests frequently in the dry stone walls.

29.—PRATINCOLA RUBICOLA. *Linn.* Stonechat. This species must be called a resident, inasmuch as it is sometimes met with in winter. The greater part, however, are migratory. We have found it common on Tadmarton Heath, and have noted it on some scrubby ground near Brailes, and, exceptionally, in one or two other localities, but have found it very locally distributed and far from common generally.

30.—PRATINCOLA RUBETRA. *Linn.* Whinchat. A summer migrant.

We have had the eggs from the Railway banks and Tadmarton Heath. Although generally distributed it is nowhere plentiful; perhaps more so at the last-named place than anywhere else. It is submitted that many reported Stonechats are referable to this species.

31.—SAXICOLA ŒNANTHE. *Linn.* Wheatear. A spring and autumn visitor, generally in March and September, but very far from common.

32.—ACROCEPHALUS STREPERUS. *Vieill.* Reed Warbler. A summer migrant. We have only once taken the eggs ourselves in the district, and must regard it as by no means common.

33.—ACROCEPHALUS SCHŒNOBŒNUS. *Linn.* Sedge Warbler. A summer migrant, and by no means confined to reeds and osier beds.

34.—LOCUSTELLA NŒVIA. *Bodd.* Grasshopper Warbler. We have met with this species on Tadmarton Heath, and in August, 1880, procured an immature bird there. We have also observed it in one or two other localities in thick bramble-covered hedges. It must be regarded as rare.

35.—SYLVIA RUFA. *Bodd.* Greater Whitethroat. A summer migrant and common.

36.—SYLVIA CURRUCA. *Linn.* Lesser Whitethroat. A summer migrant. We have met with this bird not uncommonly, and find one or more nests every year.

37.—SYLVIA SALICARIA. *Linn.* Garden Warbler. A summer migrant. Fairly common, but rarely seen unless looked for. It generally makes itself known by its sweet rich song.

38.—SYLVIA ATRICAPILLA. *Linn.* Blackcap. A summer migrant and common. In early autumn it frequents gardens for the sake of feeding on the fruit.

39.—PHYLLOSCOPUS SIBILATRIX. *Bechst.* Wood Wren. A summer migrant. This species we have found but very rarely. We have observed it on Bloxham Grove, and Mr. Beesley has given us an egg taken near Banbury many years ago. Mr. Prior informs us that he considers it very rare.

40.—PHYLLOSCOPUS TROCHILUS. *Linn.* Willow Wren. A summer migrant and common.

41.—PHYLLOSCOPUS COLLYBITA. *Vieill.* Chiffchaff. A summer migrant and common. We have recorded in the *Zoologist* for 1882, p. 114, an instance of this bird staying at Bodicote during the mild winter of 1881-2.

42.—REGULUS CRISTATUS. *Koch.* Golden-crested Wren. Resident and common. We have observed this bird in small flocks in autumn and winter.

43.—REGULUS IGNICAPILLUS. *Brehm.* Fire-crested Wren. In the *Zoologist* for 1882, p. 234, we have recorded a male specimen of this very

beautiful species killed near Banbury in the winter of 1881-2. This bird is now in our collection.

44.—TROGLODYTES PARVULUS. *Koch.* Wren. Resident and common.

45.—CERTHIA FAMILIARIS. *Linn.* Tree Keeper. Resident. This species, from its quiet and unobtrusive habits, is but little observed during the breeding season. In winter it is frequently to be seen, and sometimes half-a-dozen may be met with together, in company with the Titmouse family. We have observed their partiality to orchard trees.

46.—SITTA CÆSIA. *Welf.* Nuthatch. Resident and common, but seldom seen in summer, except in localities where old timber abounds. In early autumn they commonly frequent gardens in small parties of half-a-dozen or so.

47.—PARUS MAJOR. *Linn.* Great Titmouse. Resident and common. Its familiar and pleasing spring note is always welcome.

48.—PARUS CŒRULEUS. *Linn.* Blue Titmouse. Resident and common.

49.—PARUS ATER. *Linn.* Coal Titmouse. Resident and fairly common, though much less so than the last-mentioned species.

50.—PARUS PALUSTRUS. *Linn.* Marsh Titmouse. Resident, and occurs in about the same numbers as the last-mentioned species.

51.—ACREDULA CAUDATA. *Linn.* Long-tailed Titmouse. Resident. In autumn and winter we have often observed this species in flocks—sometimes a hundred or more together.

[PANURUS BIARMICUS. *Linn.* Bearded Titmouse. This species is included in the "History of Banbury" list on the authority of Mr. Loftus. It is very unlikely to have occurred.]

52.—AMPELIS GARRULUS. *Linn.* Waxwing. A specimen of this bird is recorded as having been killed at Helmdon.

53.—MOTACILLA LUGUBRIS. *Temm.* Pied Wagtail. Resident—much less common in winter than summer.

54.—MOTACILLA SULPHUREA. *Bechst.* Grey Wagtail. An autumn and winter migrant, and not uncommon at this season along some of our streams. In the *Zoologist* for 1879, p. 179, Mr. Prior records an instance of their breeding in an osier bed at South Newington.

55.—MOTACILLA RAII. *Bp.* Yellow Wagtail. A summer migrant and common. Conspicuous on the fallows on its arrival in spring. Before leaving us in autumn they may be observed in the meadows in flocks.

56.—ANTHUS TRIVIALIS. *Linn.* Tree Pippit. A summer migrant and fairly common.

57.—ANTHUS PRATENSIS. *Linn.* Meadow Pippit. Resident. We have observed that this is the only small bird ordinarily met with whilst

Snipe shooting in the low lying marshy meadows—where it may be seen commonly in flocks.

58.—ALAUDA ARVENSIS. *Linn.* Sky Lark. Resident and common, but in winter their numbers are considerably augmented by immigrants.

59.—ALAUDA ARBOREA. *Linn.* Wood Lark. We believe this bird to be found rarely in the district, but have ourselves never met with it.

60.—PLECTROPHANES NIVALIS. *Linn.* Snow Bunting. We have in our collection a mature male specimen killed at Aston-le-Walls early in January, 1879. Mr. Prior informs us that on the 8th of December, 1878, he observed a specimen in a stubble field at Bloxham in company with some Chaffinches.

61.—EMBERIZA SCHŒNICLUS. *Linn.* Reed Bunting. Resident and common. In winter frequenting the streams in small parties.

62.—EMBERIZA MILIARIA. *Linn.* Bunting. Resident, but more numerous in winter.

63.—EMBERIZA CITRINELLA. *Linn.* Yellow Bunting. Resident and common.

64.—EMBERIZA CIRLUS. *Linn.* Cirl Bunting. Mr. Prior informs us that he has twice taken the nest of this species, once at Bloxham, and again at Milcombe.

65.—FRINGILLA CŒLEBS. *Linn.* Chaffinch. Resident and one of our most common birds.

66.—FRINGILLA MONTIFRINGILLA. *Linn.* Brambling. An irregular and uncommon winter visitor; in some seasons, however, they appear in considerable numbers.

67.—PASSER MONTANUS. *Linn.* Tree Sparrow. Resident and common. Mr. Prior, who has paid great attention to this species, informs us that he has frequently found it breeding under old Magpie's nests.

68.—PASSER DOMESTICUS. *Linn.* House Sparrow. Resident and common.

69.—COCCOTHRAUSTES VULGARIS. *Pall.* Hawfinch. Resident. This fine species is on the increase. Until the last few years we only knew of one well-authenticated instance of its breeding, viz., at Calthorpe, many years ago, although we had it reported to us as nesting in 1878 at Bodicote, near where we have ourselves several times observed the birds. We have now, however, satisfactory evidence of its having nested at Broughton for the last two or three years at least, and it will in all probability be found to do so in other localities. In some winters (notably that of 1880-81, when many were picked up dead during the severe frost), it is met with in some numbers: these must be regarded as immigrants.

70.—LIGURINUS CHLORIS. *Linn.* Greenfinch. Resident and common. Flocks in autumn with Yellow Ammers and Linnets in the stubbles.

71.—CARDUELIS ELEGANS. *Steph.* Goldfinch. Resident. Now becoming scarce in the breeding season, but much more numerous in winter, when it may occasionally be met with in small flocks.

72.—CHRYSOMITRIS SPINUS. *Linn.* Siskin. A winter migrant but not common. Small parties may be sometimes observed feeding in the tops of alder trees, to the seeds of which they are particularly partial. In 1879 we observed eight or nine in some larches at Bodicote on 20th April. This is a very late date for their stay.

73.—LINOTA RUFESCENS.—*Vieill.* Lesser Redpoll. A winter migrant —more numerous than the last-mentioned species. Its habits are very similar, and they are frequently observed in company.

74.—LINOTA CANNABINA. *Linn.* Linnet. Resident and common, particularly so on Tadmarton Heath.

75.—LINOTA FLAVIROSTRIS. *Linn.* Twite. This species is recorded in the "History of Banbury" list, but we have not ourselves met with it.

76.—PYRRHULA EUROPÆA. *Vieill.* Bullfinch. Resident and common.

77.—LOXIA CURVIROSTRA. *Linn.* Crossbill. An irregular winter visitor, generally in small flocks. It is by no means of frequent occurrence.

78.—STURNUS VULGARIS. *Linn.* Starling. Resident and common. Very large migratory flocks occur in autumn and winter.

79.—PYRRHOCORAX ALPINUS. *Koch.* Alpine Chough. Early in April, 1881, a Chough was killed in Broughton Park, which we examined in the flesh; it proved to be a female in good condition, and showed no signs of confinement, its plumage being clean and unrubbed. The stomach contained remains of numerous coleopterous insects and one caterpillar. We originally recorded the bird [*Z*, 1881, p. 242] as an immature specimen of *P. graculus* (Linn.), but after a careful examination of specimens in the Oxford Museum, and comparison with the plates in Mr. Dresser's "Birds of Europe," we have no hesitation in referring it to the above species.

80.—CORVUS CORAX. *Linn.* Raven. This species is recorded in the "History of Banbury" list, but it is now extinct.

81.—CORVUS CORONE. *Linn.* Black Crow. Resident and common. We believe that these birds migrate southwards in severe weather.

82.—CORVUS CORNIX. *Ling.* Grey Crow. An autumn and winter visitor, but by no means common.

83.—CORVUS FRUGILEGUS. *Linn.* Rook. Resident and common.

84.—CORVUS MONEDULA. *Linn.* Jackdaw. Resident and common.

85.—PICA RUSTICA. *Scop.* Magpie. Resident. This bird has been aptly described by Mr. Prior as "the ornithological pride of the district." It is no unusual thing to see ten or a dozen together, and on 24th December, 1881, we observed no less than twenty-six fly out of one row of trees in a hedgerow. In the *Zoologist* ss., p. 4879, as noted in Professor Newton's

edition of Yarrell's "British Birds," Mr. Prior records having observed thirty-four in a stubble field in November, 1875. Tadmarton Heath may be noted as a locality in which we have observed this species to be particularly abundant.

86.—GARRULUS GLANDARIUS. *Linn.* Jay. Resident. This species breeds in the more wooded parts of the district, but it is much more generally distributed during the autumn and winter months.

87.—HIRUNDO RUSTICO. *Linn.* Swallow. A summer visitor and common.

88.—CHELIDON URBICA. *Linn.* Martin. A summer visitor and common.

89.—COTILE RIPARIA. *Linn.* Sand Martin. A summer visitor. We know of breeding colonies in a sand pit at Tadmarton Heath and at Aynho.

90.—CYPSELUS APUS. *Linn.* Swift. A summer migrant and common.

91.—CAPRIMULGUS EUROPŒUS. *Linn.* Nightjar. A summer migrant, but not at all common.

92.—CUCULUS CANORUS. *Linn.* Cuckoo. A summer migrant and common.

93.—UPUPA EPOPS. *Linn.* Hoopoe. A specimen of this bird occurred at Claydon in 1864, and another was shot in a turnip field at Cropredy Lawn some years ago.

94.—CORACIAS GARRULUS. *Linn.* Roller. One of these birds was taken at Balscott in 1869.

95.—ALCEDO ISPIDA. *Linn.* Kingfisher. Resident, still not uncommon, but becoming more scarce.

96.—GECINUS VIRIDIS. *Linn.* Green Woodpecker. Resident, and not uncommon in the more wooded parts of the district. It is more frequently noticed during the autumn months, when it is more generally distributed, and its numbers may perhaps be increased by immigration.

97.—DENDROCOPUS MAJOR. *Linn.* Greater Spotted Woodpecker. Resident. This species is most frequently met with in the Parks at Broughton, Wroxton, and Farnborough, where there is an abundance of old timber. It certainly breeds in the last-mentioned locality; Mr. H. Holbech informs us that in June, 1882, he captured a young bird, hardly able to fly, in Mollington Wood, and we have every reason to believe that it also nests in the other localities named.

98.—DENDROCOPUS MINOR. *Linn.* Lesser Spotted Woodpecker. Resident. More common than the last-mentioned species, and more generally distributed, but met with in similar localities. We have in our collection an immature specimen killed in some kidney bean sticks in a garden at Bodicote, in June, 1880.

[DENDROCOPUS VILLOSUS. *Linn.* Hairy Woodpecker. In the *Zoologist* for 1882, p. 69, we have recorded the supposed occurrence of this species, between Hook Norton and Chipping Norton, five or six years ago. It must remain doubtful whether the skin, which is in our possession, was that of the identical specimen killed there or not.]

99.—IYNX TORQUILLA. *Linn.* Wryneck. A summer migrant, not common.

100.—COLUMBA PALUMBUS. *Linn.* Ring Dove. Resident and common. In winter we are visited by large flocks, which are probably for the most part immigrants.

101.—COLUMBA ŒNAS. *Linn.* Stock Dove. Resident, but we believe it migrates southwards in winter, especially in the more severe seasons. It breeds frequently in pollard willows, and is most abundant in the well-wooded parks in the district.

[COLUMBA LIVIA. *Bonnat.* Rock Dove. This species is recorded in the "History of Banbury" list as an "occasional visitor," on the authority of Mr. Busby. Keepers frequently speak of a small blue dove which they call the "Rockier," but they probably confuse the Stock Dove with the present species, and to this bird the above note probably applies.]

102.—TURTUR COMMUNIS. *Selby.* Turtle Dove. A summer migrant and common. It has nested for several years in the top of a large old ivy-clad Weymouth Pine in our garden in the middle of the Village of Bodicote. On the 30th of September, 1879, we observed (as recorded in the *Field*) a pair in a stubble field near Adderbury; this is a very late date.

103.—PHASIANUS COLCHICUS. *Linn.* Pheasant. Resident, and common where strictly preserved. It is well known that this species has interbred largely with *P. torquatus;* a variety with a more or less perfect white ring round the neck is most commonly met with.

104.—PERDIX CINEREA. *Lath.* Partridge. Resident, and everywhere abundant in this highly-cultivated district. We have in our collection an egg of this species taken from a nest containing others of a normal colouring, which is of a pale blue tint, somewhat similar to the colour of a Redstart's eggs.

105.—CACCABIS RUFA. *Linn.* Red-legged Partridge. Now resident and becoming common. A few years ago it was deemed a rarity. We have observed the partiality of this species for breeding on an elevated situation—we know of two instances of its nesting on a straw rick.

106.—CORTUNIX COMMUNIS. *Bonnat.* Quail. A summer migrant, but far from common. We have eggs from Bloxham, and Mr. Prior informs us that he has eggs taken at Tadmarton.

107.—TURNIX SYLVATICA. *Desf.* Andalusian Hemipode. This bird, an inhabitant of Southern Europe and Northern Africa, has only been met with three times in England, once in Yorkshire and twice in Oxfordshire. The Oxfordshire birds were both killed near Chipping Norton, about 13 miles from Banbury, the first on 29th October, 1844, as recorded by Mr. Goatley (*Ann. Nat. Hist.* and *Zoologist*, 1845, p. 872), and the second shortly afterwards, recorded by the same gentleman and Messrs. Matthew (*Zoologist*, 1849, p. 2599).

*(To be continued).*

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## ORNITHOLOGICAL NOTES.

THE "GREY CROW." — CORVUS CORNIX. (LINN).

A MATURE specimen was shot at Spratton on the 11th of October last. The chief interest in noting this occurrence is to show how little the migration of birds varies beyond a few days. For reference to this species in "Notes on the Birds of Northamptonshire," see vol. II., p. 186.

October 13th, when out shooting, we observed several Redwings *(Turdus Iliacus).*

October 20th.—Several Fieldfares *(Turdus pilaris)* noticed.

October 22nd.—Several large flocks of Fieldfares seen in the afternoon, high up in the air, going southwards.

October 22nd.—A flight of eleven Great Black-backed Gulls *(Larus marinus)* were seen at Upton, winging towards the north-west. We recognized them by their peculiar note occasionally uttered.

We have this year noticed the continued increase of the several species of the *(Picidæ)* Woodpeckers in this part of the county. The Greater Spotted Woodpecker *(Dendrocopus major)* was observed at Hardingstone on the 9th October.

H. F. TOMALIN,
Northampton.

October, 1883

# A SYSTEMATIC CLASSIFICATION OF THE LEPIDOPTERA WHICH HAVE OCCURRED IN THE VICINITY OF NORTHAMPTON.

By Wm. Hull and H. F. Tomalin.

## Family II.—Phytometridæ. [a]

### Genus I.—Anisopteryx (Steph.)

*Species* 1...*A. Æscularia* (Wien Verz.) ...*March Moth*

### Genus II.—Odezia (Boisd.)

„ 1...*O. Chærophyllata* (Linn.) ...*Chimney Sweeper*
Locality..Badby, Wellingborough.

### Genus III.—Chesias (Treit.)

„ 1...*C. Spartiata* (Fuessly.) ...*The Streak*
Locality..Northampton.

### Genus IV.—Lobophora (Curt.)

„ 1..[b]*L. Lobulata* (Hübn.) ...*Early tooth-striped*
Locality..Northampton, Wellingborough.

### Genus V.—Ortholitha (Bübn.)

„ 1...*O. Palumbaria* (Wien Verz.) ...*The Belle*

„ 2... „ *Cervinata* „ ...*The Mallow*
Locality..Northampton, Sywell Wood.

„ 3... „ *Comitata* (Linn) ...*Dark Spinach*

### Genus VI.—Scotosia (Steph.)

#### Section "A."—Triphosia (Steph.)

„ 1...*S. Dubitata* (Linn.) ...*The Tissue*
*(Var.) Cinereata* (Steph.)

#### Section "B."—Scotosia (Steph.)

„ 2...*S. Rhamnata* (Wien Verz.) ...*Dark Umber*

„ 3...„ *Vetulata* „ ...*Brown Scallop*
Locality..Wellingborough.

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[a] All the various species of this large family rest with the wings expanded. Phytometridæ from the Greek Phuton—a plant, and Metron—a measure.

[b] The common name is derived from the small lobe at the base of the hind-wings in the male.

GENUS VII.—LARENTIA (Treit.)

SECTION "A."—

*Species* 1...*L. Silaceata* (Wien Verz.) ...*Small Phœnix*

SECTION "B."—

,, 2... ,, *Prunata* (Linn.) ...*The Phœnix*

,, 3... ,, *Testata* ,, ...*The Chevron*

,, 4.. ,, *Dotata* (Guén.) ...*The Spinach*

SECTION "C."—

,, 5... ,, *Pyraliata* (Wien Verz.) ...*Barred Straw*

,, 6... ,, *Fulvata* (Forst.) ...*Barred Yellow*

,, 7... ,, *Juniperata* (Linn.) ...*Juniper Carpet*
Locality..Northampton.

,, 8... ,, *Corylata* (Thunb.) ...*Hazel Carpet*
Locality..Salcey Forest.

,, 9... ,, *Russata* (Wien Verz.) ...*Common Marbled Carpet*

*(Var.) Comma-Notata* (Steph.) ...

*(Var.) Saturata* ,, ...

,, 10...*L. Immanata* (Haw.) ...*Marbled Carpet*

SECTION "D."—

,, 11... ,, *Rivata* (Hübn.) .. *Wood Carpet*

,, 12... ,, *Unangulata* (Haw.) .. *Sharp-angled Carpet*
Locality..Whittlebury Forest.

,, 13... ,, *Sociata* (Borkh.) ...*Common Carpet*

,, 14... ,, *Montanata*(Wien Verz.) ...*Silver-ground Carpet*
Locality..Whittlebury Forest, Salcey Forest, Yardley Chase, etc.

,, 15... ,, *Unidentaria* (Haw.) ...*Dark-barred Twin-spot Carpet*
Locality. Northampton.

SECTION "E."—

,, 16..c ,, *Ocellata* (Linn.) .. *Purple Bar*

,, 17... ,, *Olivata* (Wien Verz.) ...*Beech-green Carpet*
Locality..Harlestone Heath.

,, 18... ,, *Pectinitaria* (Donovan) ...*Green Carpet*

SECTION "F."—

,, 19... ,, *Munitata* (Hübn.) ...*Red Carpet*

,, 20... ,, *Propugnata* (Wien Verz.) ...*Flame Carpet*
Locality..Salcey Forest.

,, 21... ,, *Quadrifasciaria* (Cl.) ...*Large Twin-spot Carpet*

c The hind-wings in this species are white.

*Species* 22...*L.* *Fluctuata* (Linn.) ...*Garden Carpet*
,, 23..[d],, *Rubiginiata* (Wien Verz.) ...*Blue-bordered Carpet*
Locality..Salcey Forest, Hardwick Wood.
*(Var.)* *Plumbata* (Curt.)

SECTION "G."—
,, 24...*L.* *Miata* (Linn.) ...*Autumn Green Carpet*
,, 25... ,, *Bilineata* ,, ...*Yellow Shell*

SECTION "H."—
,, 26... ,, *Tristata* (Linn.) ..*Small Argent and Sable*
Locality..Salcey Forest.
,, 27...[e],, *Hastata* ,, .. *Argent and Sable*
Locality..Yardley Chase, etc.

SECTION "I."—
,, 28... ,, *Albicillata* (Linn.) ...*Beautiful Carpet*
Locality..Hardwick Wood.
,, 29... ,, *Badiata* (Hübn.) ...*The Shoulder Stripe*
,, 30... ,, *Derivata* (Wien Verz,) ...*The Streamer*
,, 31.[f],, *Elutata* (Hübn.) ...*July Highflyer*
Locality..Salcey Forest, Yardley Chase, etc.

SECTION "K."—
,, 32... ,, *Didymata* (Linn.) ...*Twin-spot Carpet*
,, 33... ,, *Multistrigaria* (Haw.) ...*Mottled Carpet*
Locality..Harlingstone, 1832.
,, 34... ,, *Cæsiata* (Wien Verz.) ...*February Carpet*
Locality..Hardingstone.
,, 35... ,, *Salicata* (Hübn.) ...*Striped Twin-spot Carpet*

SECTION "L."—
,, 36... ,, *Alchemillata* (Linn.) ...*Small Rivulet*

SECTION "M."—
,, 37..[g],, *Decolorata* (Hübn.) ...*Sandy Carpet*
Locality..Hardwick Wood, Yardley Chase.

GENUS VIII.—OPORABIA (Steph.)
,, 1...*O.* *Dilutata* (Wien Verz.) ...*November Moth*
*(Var.)* *Autummata* (Guén.)

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*d* The blackish variety was obtained from Salcey Forest.
*e* The larvæ are sometimes marked with a row of yellow horseshoe-shaped spots on the sides.
*f* Aberrations frequently are found with the fore-wings dark grey.
*g* The larvæ feed on the seeds of the Red Campion (*Lychnis diurna*).

GENUS IX.—CHEIMATOBIA (Steph.)

*Species* 1..[h]*C. Brumata* (Linn.) . *Winter Moth*

GENUS X.—HYDRELIA (Hübn.)

,, 1...*H. Sylvata* (Wien Verz.) ...*Waved Carpet*

,, 2... ,, *Candidata* ,, ...*Small White Wave*

,, 3... ,, *Luteata* ,, ...*Small Yellow Wave*

GENUS XI.—EUPITHECIA (Curt.)

,, 1...*E. Venosata* (Fabr.) ...*Nettled Pug*

,, 2... ,, *Pusillata* (Wien Verz.) ...*Dwarf Pug*

Locality..Northampton, Holdenby.

,, 3... ,, *Vulgata* (Haw.) ...*Common Pug*

,, 4... ,, *Absynthiata* (Clerck.) ...*Wormwood Pug*

Locality..Whittlebury Forest, etc.

,, 5... ,, *Minutata* (Guén.) ...*Ling Pug*

Locality..Harlestone Heath, Spratton.

,, 6..[i] ,, *Rectangulata* ,, ...*Green Pug*

Locality..Whittlebury Forest.

*(To be continued).*

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[h] The larvæ of this moth causes much destruction to orchards—the young larvæ living in the interior of the bud. The female is apterous.

[i] The larvæ attack the buds and blossom of the apple and pear, causing much destruction in some parts of the country.

Of two hundred and seventy-four British species of Geometrina, we have recorded one hundred and twenty species.

# NOTES ON THE BIRDS OF NORTHAMPTONSHIRE.

By Lord Lilford, F.L.S.

104. Common Kingfisher. *Alcedo ispida.*

We are glad to say that this beautiful bird is still common in the portion of our county with which we are best acquainted, although in some parts of the kingdom, where it was formerly abundant, we are informed that it has been almost exterminated by the craze for brilliant feathers which seems occasionally to seize upon the fair sex, a remnant, no doubt, of the barbaric taste of our ancestresses for personal adornment. Other reasons may also have to do with the destruction of this species, viz. the demand for portions of its plumage for making artificial flies, and the prejudice against this bird on account of its piscivorous habits. This latter charge cannot be denied; but by far the majority of the fishes taken by Kingfishers are of course small in size and of small value, as the bird is certainly more addicted to comparatively still waters, which afford an abundant supply of minnows, sticklebacks, and the fry of the coarser species, than to the rapid streams in which the Salmonidæ delight. The Kingfisher is said to be a very early breeder, and instances are on record of young birds having been met with out of the nest in the month of March; but in our county, as also in Oxfordshire and Devonshire, we never met with an occupied nesting-place earlier than the beginning of May. We use the expression nesting-place advisedly, for we have never found in the holes tenanted by this species any thing that could be correctly called a nest, though the eggs are often laid upon the indigestible portions of food cast up by the parent birds. The Kingfisher usually selects the steep bank of a river, brook, or pond in which to commence its boring operations; but we have now and then discovered the breeding-establishments of this species in gravel-pits at a considerable distance from water: the tunnel generally slopes gently upwards to a distance of eighteen inches or two feet, and ends in a slight enlargement, in which the eggs are placed; these are from six to eight in number, of a pure glossy white, and nearly round. On leaving their nursery, the young birds perch on any neighbouring boughs, and keep up an incessant cry for food for the first few days, but soon learn to catch their prey for themselves. Many authors state that the Kingfisher hovers for a few seconds before making his plunge at his intended victim; but we have personally found this to be an exceptional habit, the bird usually darting

directly from its perch, and emerging immediately, flies to a bough or twig overhanging the water, and after giving the captured fish a smart blow or two against the perch, tosses it into the air and swallows it head foremost. We often notice this species making its way rapidly across country at great distances from any stream, bound to or from some pond in search of food, which although, as we believe, always taken from the water, does not consist by any means exclusively of fishes, water-beetles and tadpoles being favourite morsels. The Kingfisher flies very quickly, generally low over the water, and is a bird of comparatively solitary habits; for although in most years several may be observed in the course of a ramble along the banks of the Nen, or a day's fishing in its waters, it is seldom that we meet with more than two in company, except in the early summer, when we occasionally come upon a family-party.

In common with most of our birds, this species, if not persecuted and taught by experience to avoid the sight of man, will become very fearless and even familiar. We have often watched their method of fishing from a few yards' distance, whilst sitting quietly but quite unconcealed in our boat; and on one occasion a Kingfisher settled on a fishing-rod which was resting over the side of a punt in which we were at luncheon. The cry of this bird is an oft-repeated shrill scream, by no means musical, but to our own ears full of pleasant memories and associations. During severe weather, when our waters are frozen, most of our Kingfishers leave us for the sea-shores, the few that remain with us being often found starved to death.

The Kingfisher is tolerably common in most parts of Europe with which we have any personal acquaintance, but in some of them appears to be only recognized as a winter visitor; and we were assured this summer (1883), as an extraordinary fact, that a nest of the "Ice-bird," as this species is pretty generally called by the peasantry of North Germany, had been found on the banks of the Ahr, in Rhenish Prussia, where we have often observed the Kingfisher during our visit to Neuenahr in the months of May and June. This bird is not uncommon during the winter months in Andalucia. My friend Lieut.-Colonel L. H. Irby says, in his 'Ornithology of the Straits of Gibraltar,' 1875, "I have no record of its occurrence during the breeding-season, that is, not later than *the end* of April; the majority arrive in October, leaving in March." But we have this year received information from an officer of the garrison of Gibraltar that Kingfishers breed near Gibraltar now pretty freely, and that two nests have been found in that neighbourhood during this past summer of 1883. We have frequently reared young Kingfishers from the nest, and found that in a large cage with a plentiful supply of small live fishes they may be kept in good health for a considerable time; but although they may, as we say in falconry, be

"trained off" to feed upon worms and raw meat by placing this food in their water-pan, they never thrive long upon any other than a fish diet. In common with most piscivorous birds, the digestion of the Kingfisher is a very rapid process, and its appetite consequently voracious; this of course renders it very difficult to keep their place of confinement in good order; and though they become very tame and interesting to watch, we consider that here, at least, where we have abundant opportunities of observing the bird in a state of nature, the keeping of Kingfishers costs more trouble than it is worth; and from their savage character amongst themselves, it is necessary to separate them as soon as they are fully grown.

105. BEE-EATER. *Merops apiaster.*

This species, though an exceedingly abundant summer migrant to many parts of Southern and Central Europe, is a comparatively rare visitor to this country; and my sole authority for its occurrence within our present ornithological limits is a letter from Mr. A. G. Elliott, of Stamford, dated March 4th, 1876, who therein writes:—"A pair of these scarce birds built a nest in the bank of a pond close to Kelthorpe, a hamlet to Ketton, Rutland, in the summer of 1868; the nest was composed of bones, wings, &c. A man in the employ of C. O. Eaton, Esq., shot one bird, which I stuffed for Mr. Andrews, of Ketton; the young being able to fly, got away with the other bird." The above story so much astonished me that I cross-examined Mr. Elliott (who called here shortly after writing the above letter) very closely; he confirmed every word of the letter above quoted most positively, and convinced me that a Bee-eater had been shot at the spot above mentioned, and passed through his hands for preservation. But as regards its nest, I must confess that I am still very sceptical: besides the extreme improbability of the Bee-eater nesting in this country, the mention of bones in said nest points at once to the Kingfisher, the present species being entirely insectivorous. The "wings" were, of course, those of insects; and so far their presence in the nest is in favour of the Bee-eater theory. It is, of course, not impossible that a Bee-eater might take possession of the nesting-hole of a Kingfisher; but I consider that this part of the story is, to say the least of it, somewhat "*mixed*," though I have no doubt as to Mr. Elliott's perfect good faith, nor, as I have just stated, the fact of a Bee-eater having been seen by him "in the flesh." I must add that Mr. Elliott is perfectly well acquainted with the present species, and assured me that he often saw the two birds at the spot above mentioned. The Mr. Andrews above mentioned had migrated to Melton Mowbray, and could not be found by Mr. Elliott, who at my request went thither to seek for him. The above is the whole story as it came to me; and on this

evidence I trust that my readers will consider at least that I am justified in recording the Bee-eater as having occurred in the district of which I am treating.

This beautiful bird is exceedingly common in southern and many parts of central Spain, where we have formed an intimate acquaintance with its habits. It arrives in that country about the end of March or beginning of April; my friend Lieut.-Colonel Irby, in his 'Ornithology of the Straits of Gibraltar,' notes March 26th as the earliest, and April 7th as the latest, date of arrival observed by him from 1868 to 1872, and adds "The latest flight I ever saw going north was on the 7th of May." We were in Andalucia this year (1883), from about the end of February till nearly the end of May, and saw the first Bee-eaters of the season on April 11th, in the great plains of the Guadalquivir below Seville, but heard their unmistakable and well nigh indescribable cry high in the air on the previous day. Soon after their arrival the Bee-eaters are to be seen all over the country, skimming like Swallows low over the plains and sometimes at a great height in the air, but always busily engaged in the pursuit of their insect food; they commit great havoc amongst the beehives, and lads are often employed to shoot at and scare them from these sweet-goods stores. We once witnessed the arrival of a large flock of Bee-eaters from Africa on the coast of Andalucia, near the town of Marbella; it was early morning on a bright day about the beginning of April, 1864; we heard the chide of the birds before we could see any of them, and in a few minutes were aware of some five or six plunging almost vertically from a great height into a solitary Carôb tree of no great size, which grew some twenty yards from the sandy sea-beach; this advanced guard was quickly followed by scattered detachments of hundreds, all of which settled in the tree just mentioned. We remained for perhaps half an hour at a short distance, delighted spectators of this most interesting exhibition of bird life; during the whole of the time the Bee-eaters kept pouring into the tree, till its dark and dense foliage was completely hidden by a mass of animated and brilliant colours. The birds were evidently fatigued, and on our approaching closely to the tree only a few of them rose and circled for a minute or two in the air, settling again wherever they could find perching-space among their travelling companions. These birds resort within a few days of their arrival to their breeding-places, which are generally tunnels in the banks of rivers and ravines, sometimes in a slight elevation in open sandy ground; in this last case the Bee-eater bores down vertically for a short distance, and then runs a horizontal shaft for perhaps two or three feet to the breeding-chamber, which is merely a slight enlargement of the tunnel. In a steep bank the tunnels often run in a horizontal direction to a distance of six or seven feet; no nest is made,

but an accumulation of the castings of birds, as in the case of the Kingfisher, is often to be met with under and around the eggs, which are generally from four to six in number, of a translucent white, and very much rounded. This species seems to leave its breeding-haunts as soon as the young are strong on the wing; and after the middle of August very few are to be seen in Andalucia. Colonel Irby is, no doubt, perfectly correct in attributing this comparatively early departure to the fact that in that country all vegetation is scorched up at the season just mentioned, and there are no flowers for the bees and other honey-seeking insects to work upon. The Bee-eater often takes its prey from its perch, returning to the same spot after the capture, in the manner of the Flycatcher, Shrikes, and other insectivorous birds. We have met with these brilliant birds in Sardinia, Sicily, Malta, the Ionian Islands, Cyprus, and Algeria.

106. GREEN WOODPECKER. *Gecinus viridis.*

This bird, though still common throughout our county, is certainly not so abundant in this immediate neighbourhood as I remember it to have been some thirty years ago. I cannot account for this diminution in its numbers, as this district is eminently adapted to its habits, and it is not persecuted by gamekeepers or any other persons, to our knowledge; but the fact remains that during the months of August, September, and October, when I am generally at home, we seldom see or hear more than two or three Green Woodpeckers, whereas formerly at the same season of the year we used frequently to meet with a dozen or more in a day's shooting, and their cry was incessantly heard in the close neighbourhood of this house. This Woodpecker is a shy and wary bird, and any one desirous of closely observing its habits, must be very cautious in his movements, and "keep as *small*" as possible. The flight is performed by a series of undulations with vigorous but easy beats of the wings, the sound of which may be heard at a considerable distance. The examination of a tree for food generally commences near the ground or on the lower side of one of the lower branches, and is carried on by a succession of sudden jerks or jumps, whilst the bird darts its long tongue into every likely hole or crevice in the bark, and if conscious of being observed, keeps the tree-trunk, or a strong bough, between itself and the observer, peering round every now and then to see if all is right. The Woodpecker seems seldom to climb a tree for any great distance in a straight-upward direction, but ascends spirally with frequent excursions on to likely boughs, hardly ever, in our experience, sitting across a bough as most other birds do. Almost every insect seems to come into the bill of fare of this species; and although the timber-beetles and their grubs, with ants, caterpillars, and spiders no doubt form its staple diet, we

have once or twice seen it dart from a tree and capture a passing moth or butterfly, and often seen it searching for "gentles" on horseflesh hung up for breeding those animals as bait for fishing-purposes. Ants and their eggs are very favourite morsels with the Woodpecker, who digs holes in the hills made by these insects and watches like a Heron for his prey. The stiff tail of these birds is used as a support in tree-climbing, but seems to be much in the way in their terrestrial explorations; and the actions of the Woodpecker on the ground are awkward and grotesque. In this neighbourhood, elms and ash trees seem to be the favourite nesting-places of the Green Woodpecker; but as long as the wood is soft and rotten at the core, they are not very particular as to the species of tree; and we have met with their nests in poplars, willows, alders, and various fruit-trees. The hole is bored with marvellous rapidity by both birds, horizontally, till the rotten wood is reached, when they turn downwards at an acute angle for some inches and enlarge the bottom of their shaft to receive the eggs; the chips of wood are thrown and carried out to the mouth of the hole, and are the best means of leading to the discovery of a tenanted breeding-hole, though these birds seem to begin upon and work at several spots for some time before finally settling upon their nursery; and from this habit we have frequently been disappointed in excavating into trees at the foot of which we had found a heap of fresh chips. The eggs are generally five or six in number, of a pure, glossy white, and are laid on a few chips left in the hole, or on the bare wood. We have previously alluded in these notes to the frequent habit of the Starling of taking possession of the nesting-labours of the Woodpecker, and the apparent reason of the victory of the weaker bird; an instance of this came under our special notice some years ago in our orchard at Lilford: a pair of Woodpeckers had selected an old apple-tree, and as the orchard was a good deal frequented during the working-hours of the day by the gardeners and ourselves, the birds worked vigorously from daylight till the featherless labourers came upon the scene, had another good spell during the dinner-hour, and again in the evenings from 6 P.M., when the men left off work, till dusk. The boring-operations were commenced upon the main trunk of the tree, at a height of about 5 feet from the ground. When we first discovered the work, the incision was hardly an inch deep; but on the fourth day the birds had reached the rotten wood at a distance of about 5½ inches, and on the seventh had ceased to work. By the aid of a pliant switch we could feel the botton of the shaft, and twice put out the bird by so doing; but she did not desert her home, as we subsequently watched her enter and leave it on several occasions during at least a week after the conclusion of the boring-operations, till one day, on tapping the tree, a Starling flew out, and, as we soon afterwards discovered, had carried in a quantity of dry grass and feathers. Not a fragment of Woodpecker's eggs was found

by us, nor had the Starling laid any, though her nest was apparently quite ready for their reception. The Green Woodpecker appears often to pass the nights of autumn and winter in its nesting-holes, and may occasionally be found therein at those seasons even in the daytime. We believe that in this county the bird is known by no other name than Woodpecker; but "Yaffil" or "Yaffle" is often applied to it in some of our southern counties, a nickname derived, no doubt, from its ordinary call, besides which note the bird has a variety of cries, for the most part harsh and discordant. This Woodpecker is, according to Yarrell, found more or less commonly throughout England, is uncommon in Scotland, and exceedingly rare in Ireland. We have met with this bird in abundance in Northern Germany, France, and Italy; but in Spain it is represented by a nearly allied and very closely resembling race, *Gecinus sharpii* of H. Saunders.

The young of this species may be kept alive in confinement, but require great care and attention and a variety of diet: insect food is absolutely essential to their health during their progress towards maturity, and we have found it difficult to make them take to any other; but finely chopped or scraped raw beef with soaked bread, crushed hemp-seed, and filberts will sometimes induce them by degrees to acquire a taste for fruit of various sorts. They become exceeding tame, and are, from their quaint manners and attitudes, interesting inmates of an aviary. The ordinary laughing cry of this species when uttered more frequently or vigorously than usual was, it seems, taken as an indication of coming rain, and gained for the Woodpecker the name of "Rainbird" in some parts of England; but, beyond the fact that most arboreal birds are more restless and noisy in rough than in calm weather, we have failed to verify the idea just mentioned. On this subject, and indeed on all others connected with British bird-lore, we refer our readers to the often-quoted 4th edition of Yarrell's "British Birds."

107. GREATER SPOTTED WOODPECKER. *Dendrocopus major.*

This bird, although the least common of our Woodpeckers in this district, is by no means rare, though Morton, in his 'Natural History of Northamptonshire,' says of it:—"The greater Spotted Wood-pecker (Pipra), Arist. In ten Years' Time I have seen no more than Three of them: One in Thorp Underwood Lordship, another in Brampton Wood, the Third at Oxendon." From its shy and solitary habits this species is more frequently heard than seen, and even its ordinary note, a sharp monosyllable, though loud and unlike that of any of our own common birds, often passes unnoticed by the many who are not acquainted with the bird. In this neighbourhood we generally meet with this Woodpecker on the outskirts of our large oak-woods in the spring and summer; but it is a great wanderer,

and when our trees are bare of leaves it would be difficult to say where there is not a chance of seeing or hearing a Pied Woodpecker, by which name it is commonly known hereabouts. In general habits this bird much resembles the Green Woodpecker, but is, as mentioned in Yarrell's 4th edition, less often to be seen on the ground, although we have seen it more than once engaged upon an ant-hill, and it is certainly more addicted to fruit than that species. With reference to the loud jarring noise produced by some of this family of birds, as it has only once happened to us to see the present species in the act of producing it, we propose to treat of it in the next article.

Though two or three, perhaps more, pairs of this species undoubtedly breed annually within a radius of three miles from this house, we can only call to mind three instances of the finding of occupied nesting-holes therein. The latest of these discoveries was made by one of our gamekeepers on July 17th of this year (1883); the hole was in an oak tree at about 30 feet from the ground, and contained three well-feathered young birds. The other two nests were also in oaks, and contained respectively three and four eggs, which are of a pure white, smaller, of course, and rather more pointed than those of the Green Woodpecker. We have reason to believe that the present species suffers to a greater extent than the preceding from the acquisitive propensities of the Starling; within the last few days we have heard of an instance of this "forcible entry" into a hole made by these Woodpeckers near Kingston, Surrey. Besides the names of "Greater Spotted" and "Pied" Woodpecker, we have heard Northamptonshire gamekeepers mention this bird as "French Pie" and "Whittle," which latter name is also applied in some counties to the Green Woodpecker. The young of this Woodpecker are much less difficult to keep in confinement than the species last treated of, as they take readily to a fruit and vegetable diet and thrive thereupon; they become very tame, and if set loose in a room will examine the furniture closely and methodically, and clamber over the clothes of their keeper, search his pockets for food, and come down from the cornice or top of book-shelves, pictures, &c., at once on the offer of a fly or meal-worm. We have met with this species in various parts of France, Northern Germany, Italy, Spain, and Switzerland, in some parts of which country it seemed to be more abundant than in any other localities with which we have any acquaintance. In our own country we have noticed this bird in Middlesex, Herts, Bedfordshire, Oxfordshire, Hampshire, Norfolk, Suffolk, and Devon; it appears that it becomes more scarce in our northern counties, and in most parts of Scotland is decidedly rare as a resident; but the fact of its autumnal or winter migration to the northern portions of the kingdom seems to be well established. It is, as we have previously stated, at all times a wandering and restless bird, and adapts itself to any sort of locality

as a halting-place; but from our own observations we should say that its favourite haunts are evergreen forests and woods in which old birches and alders abound.

A very closely allied species, the Middle Spotted Woodpecker, *Picus medius* (Linn.), has been admitted by some authors into the list of British birds; but it appears that this bird has no real claim to be therein included (*vide* A. Newton, Yarrell's 'British Birds,' 4th edition, vol. ii. pp. 483, 484); and the same observations apply to the Black Woodpecker, *Picus martius* (Linn.), of whose occurrence in our county we have a report.

108. LESSER SPOTTED WOODPECKER. *Dendrocopus minor.*

This little bird, though considered rare in many parts of England, is certainly now the most common of our three species of Woodpecker in this neighbourhood; and we have observed it in every part of our county with which we have any acquaintance, though from its small size and comparatively silent habits in the summer months, its presence may often remain a secret to those who are not specially interested in ornithology. In the first sunny days of February, and sometimes even earlier, the loud jarring noise produced by this species may be heard amongst the tall elms and other trees closely surrounding Lilford, often proceeding from two or three birds at the same moment, and continued at intervals from daylight till dusk. From long and close observation we long ago convinced ourselves that this noise is a call, and has nothing to do with intentional disturbance of insect food, as has often been supposed and stated; nor is it produced, as we with many others formerly imagined, by the rapid vibration of the bird's beak in a crack of rotten wood, but simply by a hammering or tapping action which the human eye cannot follow; on a calm day, or with a light favouring breeze, the sound thus produced may be heard at a distance of quite half a mile or even more. This little Woodpecker is an eminently pugnacious bird; and we have been much amused at the pertinacity with which it will attack Nuthatches, Titmice, Tree-creepers, and others of its own species, and probably sex, which may encroach upon or near to its favourite rotten boughs—generally, in this immediate neighbourhood, the dead tops of tall elms; but the alder seems also to be an often-selected "pleasaunce;" and the island between our stone bridges at Lilford, which is the home of many trees of that species and horse-chestnuts, has been the principal scene of our researches into the manners and customs of this interesting and pretty bird. In this spot, on a fine morning in February or March, one may be certain of hearing the hammering in a few minutes, and as certain of very soon hearing it answered, either in a similar fashion or by the rapidly-repeated monosyllable, "tweet, tweet." Both sexes produce

both sounds, as we have proved by shooting and dissection. With a little caution we have repeatedly approached to within a few yards of the bird or birds at this time of year; but so marvellously rapid is the hammering action of the head that is was only by the aid of a field-glass that we satisfied ourselves as to the means by which such small operators produced such a resonant result. We have once or twice seen a pair of these Woodpeckers in "coitu" towards the end of March, but never heard of eggs in their nest-holes before the last week of April. The preparation of the breeding-places seems to be carried on in exactly the same manner as by the other British Woodpeckers: no nest is made. The eggs average from five to eight in number, and are of a pure glossy white. The young of this species may often be found in their nurseries long after they are able to fly and take care of themselves. We cannot venture to say whether a second brood is ever produced or reared, but the first brood is sometimes to be found, as above mentioned, late in July. Old fruit-trees, poplars, willows, birch, alders, and elms are certainly the favourite breeding-localities; the selected spot is generally at a considerable height, and, from the tenuity and rottenness of the chosen bough, it is often exceedingly difficult to obtain the eggs unbroken.

"Little Woodpecker" and "Hammer-bird" are the only names which we have heard applied by our county people to this species; but "Barred Woodpecker" is, to our minds, the best and most distinctive appellation; our only reason for not using it at the head of this article is that it is not so commonly used or known as it deserves. We believe that this bird feeds exclusively on insects, and we have never heard it accused of any depredations in orchards or on fruit of any kind. We have never kept any of these little Woodpeckers in confinement, and every attempt to do so that has come to our knowledge has resulted in disastrous failure, although, no doubt, it is to be done. The great difficulty with all purely insectivorous birds is, of course, in the first place, the procuring a constant supply of their natural food or an acceptable substitute for it; but it appears to us that besides this difficulty, which may in some instances be conquered, it is absolutely essential to their health that they should have a considerable amount of exercise in seeking for their food, and, except in large open-air aviaries, this is not easily managed. We have met with the present species in France, Northern Germany, Italy, Switzerland, European Turkey, and Spain, but nowhere in such abundance as about Lilford.

109. WRYNECK. *Yunx torquilla.*

This, though never, in our experience, very abundant in our neighbourhood, is a tolerably common and well-known spring visitor, generally making

its appearance within a few days before or after April 10th, and immediately announcing its presence by a cry which bears a resemblance to that of the species last described, and a still greater resemblance to that of the young Hobby *(Falco subbuteo)*. From its arrival about the same time as the Cuckoo this bird has gained the name of "Cuckoo's mate" in many if not most parts of England; but our country-people are not, as a rule, very discriminating in ornithology, and hereabouts we have heard the epithet above mentioned applied to the Tit-lark, Pied Wagtail, and any other small birds, except the Swallow family, which may be seen following a Cuckoo in the spring season, a habit that, as far as our own observation goes, does certainly not extend to the present species. Morton, in his work on our county natural history, mentions the Wryneck as "not an uncommon bird in the northern Part of the County near Market Harborough in the Spring Season," and adds, "What becomes of it in the Winter I know not." The migration of birds was, at the time when our author wrote, a very great puzzle to observers, and, in spite of the light thrown upon the subject since his day by many very competent writers, still remains a somewhat mysterious matter, concerning which we have all yet much to learn. The fact of the migration to and from our islands of many species is now well established and commonly known; but the courses, causes, and variations of these travels, and more especially those of *local* migrations, are subjects upon which all lovers of birds must wish for full and accurate records. No correct observations of the habits of birds, however apparently trivial, are without their value; and we trust that those members of our Natural History Society who may have opportunities for such observations will take this presidential lecture in good part and give us the satisfaction of reading its results in our Journal.

To return to our bird, the Wryneck is, although a common species in many parts of England, comparatively seldom seen, and though constantly heard in April, May, and June, requires to be looked for, as it principally haunts leafy trees, and from its quiet colouring may often be mistaken for other birds. Its principal food certainly consists of ants and their pupæ; but it will eat almost any of our common insects, and searches the bark of trees by climbing, after the fashion of the Woodpeckers; the tongue is of extraordinary length, nearly cylindrical for some distance, ending in a hard sharp point, and covered with a glutinous matter, to which its insect prey adheres. The flight of the Wryneck resembles that of the Woodpeckers, but is apparently less laborious; its actions and attitudes on the ground are somewhat awkward, on account of its short legs and its habit of keeping the stiff tail "cocked" at an angle to the body. The Wryneck does not, indeed *cannot*, bore into trees to make nesting-holes, but takes possession of the

labours of Woodpeckers or any other cavities in trees which may suit its views; and though, as far as we know, it never makes any nest for itself, it will lay on the materials collected by other hole-nesting birds, especially, in this neighbourhood, the nests of the Tree-Sparrow, giving a decided preference to the hollows of old fruit-trees and pollard willows. The eggs are pure white, and, according to Yarrell (4th edition), vary from six to ten in number; from our own experience we should say that seven is about the average, but we have found nine, and once eleven; they may be distinguished from those of the Barred Woodpecker by their larger size and a slight difference in texture of the shell, but are quite similar enough to be often labelled by careless egg-collectors as belonging to that species. The Wryneck appears to be more or less common throughout England, but scarcer in our western counties and in Wales than anywhere, rare in Scotland, and has, according to Yarrell (edition *supra sit.*) only once been recorded as occurring in Ireland. The name Wryneck is derived from the curious manner in which this bird twists and writhes its head and neck when handled or irritated. We have more than once caught the bird in its nesting-holes, and found that, after vehement snake-like contortions, ruffling the feathers of head and neck, and some vicious pecks at our fingers, it will feign death, but take the first opportunity of escape. An instance is quoted in Yarrell in which no less than forty-two eggs were taken at various times in one summer, between May 29th and July 13th, from a nest of this species, and in the following year as many more from the same hole. We have met with the Wryneck during the summer in France, Switzerland, Italy, N. Germany, Spain, Algeria, and European Turkey, in which last-named country we also twice met with it in winter.

*(To be continued).*

# NORTHAMPTONSHIRE AS A FIELD OF STUDY FOR NATURALISTS.

[*The following was a paper read at an inaugural meeting in 1876, by the Rev. M. J. Berkeley, F.L.S., F.M.S. It will be still read with interest.*—THE EDITORS].

IN rising to address you this evening, after a study of various objects of scientific interest for more than half-a-century, it would seem mere hypocrisy if I told you that I felt at all nervous in doing so. Increasing years, however, bring with them their own peculiar burdens, in loss of energy and defective memory, and I could therefore almost wish that the task had fallen on younger shoulders. Believing, however, most sincerely that there never was a time, as regards our highest interests or the general welfare of society, which called more imperatively for the sound judgment of common sense than the present, and assured that nothing is so well calculated to train the mind to estimate the several questions which meet us at every turn in a true and just balance, as the study of natural science, I have thought it my duty, so far as my powers may extend, to give a helping hand. The promotion of a taste for scientific research is one of the principal benefits which are derived from meetings of this nature. We scarcely expect to make any great discoveries in a district like our own, though the hope is not altogether unreasonable; but the mutual intercourse of persons united by one common interest has an obvious tendency to encourage that love of natural science, which is at once so productive of pleasure to its followers, and which may have, at the same time, so beneficial an influence in a far wider direction. One of the most attractive objects of our field clubs is the investigation of the structure of that portion of the land in which our lot is cast. It was once believed that Northamptonshire was peculiarly void of interest in this direction. It is curious that in Morton's "History of Northamptonshire," which was published at the beginning of the last century, it is stated that there is no iron ore in the county. This is the more curious, because he was well acquainted with the neighbourhood of Oundle, and the immense bed of scoriæ in Oundle Wood, which he certainly had seen, might have taught him a different lesson; while the numerous deposits of slag in in various portions of the county showed plainly enough that iron was extensively smelted in our Woodlands, even if Chalybeate springs, such as those of Oundle and King's Cliffe, were not sufficient indication. It is scarcely needful to say now how important are our rich deposits of iron, both as nodules and as mineral constituents. The study of these has shown us that the geology of this county is often of great interest. It is quite certain

that much remains to be done in the thin plant-bearing strata of the Northampton sand. Mr. Carruthers has shown that they are not unfruitful, and, though I had not time for the needful investigation, I saw enough at King's Cliffe to encourage research. Unless I am greatly mistaken I saw indications there of marine-coloured algæ, which were worthy of closer examination. A most important item in geological investigations is the identification of the molluscæ in the various beds. Now, though we have no opportunity in this county of studying marine molluscæ, few districts are richer in fresh water and land molluscæ. Our rivers, ponds, and woods are especially rich, and the objects which meet us are often of great beauty and elegance. The delicate Achatina acicula, which is so seldom found alive, though not uncommon in fresh water deposits, has occurred to me at Sibbertoft in full vigour. A knowledge of indigenous species is absolutely necessary in the examination of fresh water formations, and an intimate study of them is sure to lead to the acquaintance of marine forms, which at Orton Waterville, just within our limits, are found mixed with fresh water and terrestrial species. While speaking of Zoology, I ought not to omit the mention of insects as likely to reward our researches. When so rare an acquisition as Deiopeia pulchra turns up at Marston Trussell, when the Blue Oriel hovers over Barnwell Wold, when Curculio Bacchus hides itself under the bush in Rockingham Forest, and Sirex Juvencus arrests our attention by its loud hum on the borders of Leicestershire, we need not despair of finding many a variety, and even if little novelty can be expected in the larger and more obvious forms, we have but to turn our attention to the myriads of Diptera, and we shall find more than enough to raise our admiration, and to reward research by the discovery of hitherto unrecorded species. As regards the higher branches of zoology, we shall scarcely be well aware of the extent of our riches till we have the promised work of our chairman on the birds of this and the neighbouring counties. I have myself seen the ring ousel at Woodnewton, the night heron was found by Lord Lilford at Oundle, and the reservoirs which supply our canals occasionally yield rare aquatic birds. As regards animals, though the wild cat and pine marten are scarcely to be found now in this county, the Coombs which skirt Leicestershire still yield the badger, and more than one rare species of bat may still be found in the county. It is now nearly ten years since I pointed out the peculiar facilities which there are for the study of botany in North Northamptonshire. The subsequent draining of the most prolific portion of our Fen land, the disforesting of woodlands, and the general progress of agriculture have nearly destroyed many of our best localities. Such plants as Liparis Loeselii, Malaxis paludosa, Ophrys aranifera, Leythrum hysopifolium, Calamagrestis lanceolata, Andromeda polifolia, Teucrium scordium are scarcely to be met with, though our woodlands are not without interest,

and novelties sometimes appear in the most unexpected situations. An old decayed oak, for instance, was blown down at Apethorpe, and amongst the rotten fragments a single plant appeared of Cynoglossum montanum, which, for some time, yielded a numerous offspring, which, however, in its turn again vanished. Parnassia palustris, Anagallis tenella, Epipactis palustris, occur still in company with some other interesting species, while about Wansford Ophrys apifera, Ophrys muscifera, Caucalis daucoides, Inula Helenium, Scirpus sylvatica, with other interesting species, appear every year, and the woods south of Stamford abound with the lily of the valley, and are, at certain seasons, absolutely blue with columbines, where the small-leaved lime and service have been cut down. At such times, too, Epipactis purpurata makes its appearance, but seldom beyond the first year, It is, however, in the lower orders of plants, especially fungi, that we may look for novelties, and perhaps no portion of England has been more fully examined than our Northern Division. Since the volume of the English flora which contained the fungi was published in 1836, nearly 1,500 species have been added to our list, and every week is increasing the number. The fungological riches of our own county are by no means exhausted. But in these, as in other departments of botany, discoveries have been made of such interest and importance as makes us regard mere systematic botany as of secondary importance. Take, for instance, the lichens, which abound everywhere on our trees, exposed plains, and buildings. The observations of more than one botanist have gone very far to show that these are not autonomous plants, but fungi parasitic upon minute Algæ, the green, brown, and orange scurf-like bodies which abound everywhere serving as hosts to the fungi. Then, as to the fungi, it now appears that the old prejudice against the Berberry, as productive of rust and mildew, is not without foundation. The spores of wheat mildew have been made to germinate on Berberry leaves, and have produced the curious and beautiful parasite of the Berberry. This, in turn, produces one or two forms under which it is capable of self-propagation, and also of the well-known wheat rust and mildew. The same seems also to be true of the connection between the gelatinous orange fungus of the Savine and the destructive pear mildew. It is true that the peculiar fungus of either may be self-propagated for years, and assume no new form; but, under favourable circumstances, it is always ready to propagate the fearful pests of agriculturists and nurserymen. Such observations have been extended to other quarters. Then with respect to the fungus which is so destructive to potatoes, of which the present year has been quite exceptional as regards its comparative absence, Mr. W. G. Smith, by a series of careful observations, has ascertained in what shape it is capable of surviving the winter—viz., in that of what are called resting spores, while the disease itself is propagated, in wet weather, with the

utmost rapidity by means of bodies which cannot be distinguished from infusoria, except by their powers of germination. Then, again, with respect to the disease to which animals as well as plants are subject, it is quite certain that minute fungi act a very important part in the propagation and extension of disease. Every running stream and stagnant pool will afford solace for many a weary hour, in the examination of the wonderful phenomena which are exhibited in the conjugation of Algæ, and for this neither high microscopical powers nor peculiar tact are requisite. A very ordinary microscope is quite sufficient, and with the same powers the orange-coloured Peziza, which is so striking an object in our woods about old oak stumps, will give opportunity of examining the origin, without previous cell-division, of spores from something analogus to what is called organisable lymph in the animal world. Nor are such observations without their beneficial results in various directions. We have already indicated one direction in which they are likely to be available, and every day they enable us to combat with formidable diseases in the vegetable world, while they show what may or may not be expected. It is an old saying, "*Deficit exemplar vitiis imitabile;*" but the best practices may be copied by ignorance where they are not applicable. I may mention an instance which occurred some years since in this neighbourhood. A scientific cultivator had a crop of beans so hopelessly diseased that he considered that he could not do better than plough them in as a substitute for manure. A neighbour observing what he was about, ploughed a good crop of beans in mere ignorant imitation, and was well laughed at for his pains. A little knowledge is a dangerous thing, and we cannot take too great pains to be accurate, if not extensive, observers. I will but add a very few words on the "*cui boni*" principle as regards fungi. It is quite certain that a great quantity of good nitrogenous food is suffered to perish from prejudice and ignorance. A late schoolmaster at Apethorpe, who was once amanuensis to the Bakers in the preparation of the "County History," fed his family for many weeks every year, almost entirely on fungi, without the slightest untoward result. Of course he could not have done this without knowing what he was about; but it would be as reasonable to gather water-hemlock for watercresses, as deleterious for good and wholesome fungi. During the war between the Northern and Southern States of America, the knowledge of my friend, the late Dr. Curtis, was of great use in pointing out the numerous wholesome fungi, with which the woods of the Southern States abound. When provision ran lamentably short, he was of great use to combatants, as is simply shown in the interesting memoir on the subject due to his pen. Though, however, it is quite right that I should allude to the utilitarian side of the subject, I am far from thinking that it is the point of view in which natural history may most profitably be considered by our Field Clubs.

The least interesting localites will afford matter enough for that degree of preliminary study which is requisite for the proper appreciation of the various subjects which attend us at every turn. There may be less inducement perhaps amongst us for active field work, but a great end will have been gained if a habit has been acquired of considering the objects around us, with a view to their natural relations and physiological bearings. It is by means of their useful investigation that new light is daily thrown on what before was mere conjecture or pure empiricism. It is not merely to any interest of mere collecting, or much more to anything economical or acquisitive that I would direct attention, but more especially to such studies as most important exercises of human intellect. I know of few things more directly remunerative as regards the development of our reasoning faculties than a well-directed study of any branch of natural science, and it is for this reason that in most of our public examinations, and in our higher schools the study is so justly regarded. Even the unravelling in systematic botany of the various difficulties which attend on the indentification of species in any branch of natural history is a most useful exercise, and much more a diligent comparison of their mutual relations and intimate structure. We cannot all be original discoverers, but we may all acquire such a knowledge of what is around us as may make us more sound and just reasoners. Science, indeed, may be regarded, as Schiller says, from two points of view, "To one it is the high, the heavenly goddess, to the other the good cow that gives us butter." I do not see why both should not be combined, where it is possible to do so; but science to be successful must be a pursuit of love. On the one side there is multiplicity, on the other there is correspondence. Every form is alive, says the poet, yet none resembles the other. Yet all are bound by one mystical bond, and that bond, if we have eyes to see it, is Divine creative love; or, as it has been expressed by a modern philosopher, "sweetness and light."

## METEOROLOGICAL REPORT, 1883.

### JULY.

JULY proved a wet ungenial month; the first fortnight was warm, with two or three thunderstorms, accompanied by heavy rains. The temperature of the latter half of the month was much below the average; the mean for the whole month was 2° below the average at Greenwich. Attention may be called to the very low temperature of the 16th, compared with that of the 1st of January last; the mean temperature of July 16th was only 53°, whilst that of January 1st was as high as 51°. The minimum of January 1st was 6° higher than that registered on July 16th.

### AUGUST.

The weather for August was fairly fine and warm—a decided and most agreeable improvement upon that of the preceding month—which has been a great blessing to farmers and gardeners, ripening the corn and fruit very quickly, and accelerating the growth of all the root crops in a manner unknown for some years past. The rainfall for the month was very slight, being 0·89 in. below the average of the last 14 years.

### SEPTEMBER.

The temperature of September was up to the average, whilst the maximum varied from 52° to 73° only; the minimum did not go below 40° during the whole month. The rainfall was excessive, being nearly one-and-three-quarters inches above the average of the last 14 years, the heaviest fall occurring on the 29th, when rain fell from 9 a.m. until 8 a.m. of the 30th, registering 1·58 inches in Northampton; whilst at other stations it varied from 1·39 inches at Thorpe Mandeville to 2·66 inches at Peterborough, which is the heaviest fall registered in that town for the last 33 years; on the whole September was a mild, wet month, there being only one week of continuous fine weather during that time.

The Rev. H. Waller, Twywell, writes: "When one sees the abnormal fall of rain which makes September by far the wettest month of the year hitherto, he is astonished to hear on all sides congratulations passing between farmers on the favorable harvest-time they have had, but so it is, and those who took advantage of the bright hot days, which came in sequences between the heavy downpours, filled their stack-yards with corn in good condition. Still the wet and cold of July will not be denied—thrashing machines tell their own tale—the yield is very disappointing, the barley especially, though great in bulk, received injury which no subsequent fine weather could rectify. The growth of roots has been prodigious. Potatoes in the hot weather appeared to cast off the disease which had stricken them in July—the blisters on the leaf crumbled away and the tubers are hardly attacked."

F. LAW.

# METEOROLOGICAL OBSERVATIONS, 1883.

## JULY, 1883.

| STATION. | OBSERVER. | RAINFALL. Total for Month. | Total for Year. | Greatest Fall. In. | Greatest Fall. Date. | Wet Days. | SHADE TEMPERATURE. Maximum. Deg. | Maximum. Date. | Minimum. Deg. | Minimum. Date. |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 3·43 | 16·29 | 0·93 | 20 | 16 | 73 | 2 | 43 | 15 |
| " .. | F. Law..... | 3·44 | 16·53 | 0·96 | 20 | 17 | 79 | 2 & 8 | 42 | 16 |
| Castle Ashby .. | R. G. Scriven..... | 3·26 | 16·60 | 1·01 | 19 | 20 | 79 | 2 | 43 | 14 & 15 |
| Pitsford..... | C. Markham ..... | 3·57 | 17·89 | 1·21 | 20 | 19 | 85 | 2 | 42 | 15 & 16 |
| Rothwell ..... | J. More, M.D..... | 3·27 | 18·02 | 1·03 | 20 | 21 | .. | .. | .. | .. |
| Oundle ..... | S. P. Holloway .... | 3·49 | 16·85 | 0·86 | 20 | 22 | .. | .. | .. | .. |
| Towcester..... | J. Webb ..... | 4·15 | 17·49 | 1·01 | 20 | 18 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 2·75 | 16·11 | 0·80 | 20 | 18 | .. | .. | .. | .. |
| Fawsley ..... | Lady Knightley.... | 3·44 | 16·48 | 0·86 | 20 | 17 | 76 | 2 | 43 | 14 & 15 |
| Thorpe Man'ville | Seth Barnes ..... | 3·92 | 18·38 | 1·01 | 20 | 18 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 3·61 | 18·71 | 0·96 | 20 | 21 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller..... | 3·99 | 18 92 | 0 90 | 20 | 23 | 78 | 2 | 42 | 14 |
| Holdenby ..... | J. Gregory ..... | 4·04 | 19·16 | 1·03 | 20 | .. | .. | .. | .. | .. |
| Peterborough .. | J. Whitwell ..... | 2·73 | 16·40 | 0·68 | 20 | 18 | 79 | 3 & 8 | 43 | 15 |
| Average 17 years 1866-83 ..... | H. Terry ..... | 2·79 | 13·95 | .. | .. | .. | .. | .. | .. | .. |

## AUGUST.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 1·09 | 18·08 | 0·28 | 31 | 11 | 69 | 13 | 44 | 24 |
| " .. | F. Law..... | 1·26 | 17·78 | 0·34 | 3 | 12 | 70 | 13 | 44 | 12 & 25 |
| Castle Ashby .. | R. G. Scriven..... | 0·80 | 17·40 | 0·23 | 31 | 10 | 78 | 5 | 42 | 25 |
| Pitsford..... | C. Markham ..... | 1 12 | 19·01 | 0·25 | 5 | 12 | 82 | 2 | 41 | 23 & 25 |
| Rothwell ..... | J. More, M.D. .... | 0 94 | 18·96 | 0·28 | 31 | 11 | .. | .. | .. | .. |
| Oundle ..... | S. P. Holloway .... | 1·04 | 17·89 | 0·28 | 31 | 10 | .. | .. | .. | .. |
| Towcester ..... | J. Webb ..... | 1·04 | 18·53 | 0·23 | 31 | 11 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 0·84 | 16·95 | 0 21 | 31 | 12 | 55 | 14 | 42 | 23 |
| Fawsley ..... | Lady Knightley .. | 1·02 | 17·50 | 0·24 | 8 | 11 | 72 | 20 & 21 | 45 | 11 & 24 |
| Thorpe Man'ville | Seth Barnes ..... | 1·09 | 19·42 | 0·23 | 8 | 11 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 1·24 | 19·95 | 0·31 | 2 | 12 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller ..... | 1·06 | 19·98 | 0·19 | 31 | 14 | 76 | 13 | 40 | 11 |
| Holdenby ..... | J. Gregory ..... | 0·81 | 19·97 | 0·17 | 31 | 10 | .. | .. | .. | .. |
| Peterborough .. | J. Whitwell ..... | 1·09 | 17.49 | 0 36 | 31 | 6 | 79 | 21 | 45 | 16 |
| Average 17 years 1866-83 ..... | H. Terry ..... | 2·41 | .. | .. | .. | .. | .. | .. | .. | .. |

## SEPTEMBER.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Northampton .. | H. Terry ..... | 4·66 | 22·74 | 1·45 | 29 | 14 | 65 | 18 | 42 | 22 |
| " .. | F. Law ..... | 4·63 | 22·41 | 1·58 | 29 | 15 | 73 | 18 & 19 | 40 | 9 |
| Castle Ashby .. | R. G. Scriven ..... | 4·73 | 22·13 | 1·80 | 29 | 17 | .. | .. | .. | .. |
| Pitsford..... | C. Markham ..... | 5·09 | 24·10 | 1.57 | 29 | 17 | 78 | 17 & 18 | 38 | 6 & 9 |
| Rothwell ..... | J. More, M.D..... | 4·40 | 23·36 | 1·60 | 29 | 16 | .. | .. | .. | .. |
| Oundle ..... | S. P. Holloway .... | 5·08 | 22·97 | 2·18 | 29 | 17 | .. | .. | .. | .. |
| Towcester..... | J. Webb ..... | 4·99 | 23·52 | 1·63 | 29 | 16 | .. | .. | .. | .. |
| Little Houghton | J. Brawn..... | 4·91 | 21·86 | 1·81 | 29 | 14 | .. | .. | .. | .. |
| Fawsley..... | Lady Knightley .. | 4·31 | 21·81 | 1·10 | 29 | 19 | 67 | 18 | 41 | 30 |
| Thorpe Man'ville | Seth Barnes ..... | 4·51 | 23·93 | 1·39 | 29 | 16 | .. | .. | .. | .. |
| Twywell Rectory | Rev. H. Waller .... | 5·13 | 25·08 | 2·03 | 29 | 14 | .. | .. | .. | .. |
| Whittlebury .... | W. S. Miller ..... | 5·35 | 25·33 | 1·73 | 29 | 14 | 74 | 18 | 39 | 22 |
| Holdenby ..... | J. Gregory ..... | 5·28 | 25·25 | 1·51 | 29 | 15 | .. | .. | .. | .. |
| Peterborough .. | J. Whitwell ..... | 5·83 | 23·32 | 2·66 | 29 | 14 | 70 | 18 & 19 | 42 | 8 |
| Average 17 years 1866-83 ..... | H. Terry ..... | 2·86 | .. | .. | .. | .. | .. | .. | .. | .. |

HENRY TERRY, SURGEON.

## MEETINGS OF THE SOCIETY.

### JULY, 1883.

A MEETING was held in the Curators' room, Guildhall, on Tuesday, the 10th. Messrs. E. S. Macbay and Israel Wells were elected members. Various specimens were shown as follows :—Mr. Beeby Thompson—a large series of seeds from various countries ; Mr. J. Gregory—leaf-fungi ; Mr. W. D. Crick—foraminifera ; Mr. Hemmings—a very fine slowworm, *anguis fragilis*, 15 inches in length, which he had found in Yardley Chase the previous day ; Mr. H. F. Tomalin—a pied flycatcher, recently shot near here.

The members of the botanical section had an excursion to Plain Woods on the 12th.

At the meeting on the 24th, Messrs. Beeby Thompson, F.C.S., and H. J. Eunson, F.G.S., gave a description of the most striking features of the geology of the Isle of Wight ; and Mr. Thompson showed a large number of fossils from near Alum Bay. Mr. F. Law's meteorological report was read, and Messrs. T. J. George and T. Betts were elected auditors.

### AUGUST.

At the meeting on Tuesday, the 7th, Mr. Rasell exhibited a fine adder or viper, which he had caught in Yardley Chase the day before—it was 22½ inches in length.

A meeting was held on the 14th, when specimens were shown by various members, as follows :—Mr. Rasell—bones and antler from the excavations now going on in Danes' Camp ; Mr. T. J. George—a good specimen of coniferous fruit (unnamed), found by him in a pit at Kingsthorpe, in the great Oolite ; Mr. B. Thompson—specimens from the Hartshill workings, collected at the Tamworth meeting ; Mr. J. Boddington and Mr. Elkington—numerous lepidoptera.

### SEPTEMBER.

The usual meeting was held on the 4th, when a discussion arose upon the excavations at Danes' Camp, and a sub-committee was deputed to take such records as possible of anything of interest found during the excavations. Mr. Kempson exhibited a kiwi-kiwi *(Apteryx Australis)*. An interesting communication from Lord Lilford was read, being notes on birds observed in the neighbourhood of Lilford Hall, including Hobbies *Falco subbuteo*, Snipes *Scolopax gallinago*, Green Sandpiper *Totanus ochropus*, Teal *Anas crecca*, Sparrow Hawk *Accipiter nisus*, Curlews *Numenius arquata*, Osprey *Pandion haliaetus*, Turtle Doves *Turtur communis*, Whimbrel *Numenius phæopus*, Hawfinches *Coccothraustes vulgaris*.

An excursion to Castle Ashby was arranged for the 6th, but the number attending was not large. Mr. R. G. Scriven kindly acted as cicerone, one detachment viewing the house and surroundings, whilst another party had a long ramble through the woods and chase. The party met at the Falcon for tea and formal business. Mr. H. N. Dixon, M.A., was elected a member.

At the usual meeting on the 18th. Dr. T. Arnold Lees, F.L.S., etc., was elected a corresponding member.

## OCTOBER.

At the meeting on the 2nd, the following new members were elected :—The Honble. John Powys, Rev. W. Hopkinson, and Thos. Henry Burroughes, Esq. Mr. T. J. West brought a collection of fungi, etc.

On Thursday, the 11th, a Soiree, which proved very successful, was held at the Grammar School to inaugurate the winter session. The Rev. S. J. W. Sanders, LL.M., gave a brief introductory address, and during the evening short lectures were given as follows :—The Rev. Horace Waller, M.A.,—on "A South African collector unknown to fame;" The Rev. G. Nicholson, B.A.,—"A Talk about Birds," with illustrations; Mr. Beeby Thompson, F.C.S.,—"The testing and purification of drinking water," with experiments; Mr. R. G. Scriven—"Fungi—their growth and structure;" and Mr. H. Manfield gave practical demonstration of platinum printing, exhibiting many beautiful examples. Numerous objects of general and scientific interest were shown in the rooms, the special feature being a splendid collection of fungi, for which thanks are largely due to friends away, who, in answer to Mr. Newman's appeals for help, contributed most liberally. Especially may be mentioned collections from the well-known fungologist, The Rev. M. J. Berkeley, F.L.S.; Messrs. W. B. Grove (Birmingham), H. T. Soppitt (Saltaire, Yorks.), A. Carr (Sheffield), A. Walker (Colwyn Bay), Mrs. Lloyd Wynne (Coed Coch, Abergele), and others; our own members, especially Mr. T. G. West, also contributing many specimens. A series of careful drawings of fungi by Mrs. Dalton (Peterboro'), were also lent by her. Mr. Davies' showed various bee-keeping appliances. We are also indebted to our microscopists and entomologists for their assistance in showing objects, and to the friends who kindly lent graphoscopes, etc., particularly to the ladies who contributed bouquets, and to the vocalists, who so willingly assisted us.

A meeting was held on the 30th, when Mr. A. Kempson exhibited a good series of foraminifera mounted by Mr. C. Elcock of Belfast, and Mr. E. A. Durham also showed some fine slides.

## PRESERVATION OF FUNGI.

In order to preserve the fleshy fungi for the herbarium there is but one method. The Agaric, or other similar fungus, is cut perpendicularly from the pileus downward through the stem. A second cut in the same direction removes a thin slice, which represents a section of the fungus; this may be laid on blotting paper, or plant-drying paper, and put under slight pressure to dry. From one-half of the fungus the pileus is removed, and with a sharp knife the gills and fleshy portion of the pileus are cut away. In the same manner the inner flesh of the half stem is also cleared. When dried, the half of the pileus is placed in its natural position on the top of the half stem, and thus a portrait of the growing fungus is secured, whilst the section shows the arrangement of the hymenium and the character of the stem. The other half of the pileus may be placed, gills downward, on a piece of black paper, and allowed to rest there during the night. In the morning the spores will have been thrown down upon the paper, which may be placed with the other portions. When dry, the section, profile, and spore paper may be mounted together on a piece of stiff paper, and the name, locality, and date inscribed below, with any additional particulars. Some small species may be dried whole, or only cut down the centre, but the spores should never be forgotten. When dried, either before or after mounting, the specimens should be poisoned, in order to preserve them from the attacks of insects. The best medium for this purpose is carbolic acid, laid on with a small hog-hair brush. If the specimens are afterwards found to be insufficiently poisoned, or that minute insects are present in the herbarium, fresh poisoning will be necessary.—*Cooke & Berkeley's Fungi*, p. 288.

THE HORSECHESNUT AT BURLEIGH.

*Printed by the Woodbury Permanent Photographic Printing Company,*
*from a Negative by Mr. F. Wright.*

# TREES OF NORTHAMPTONSHIRE. XV.

## The Horse Chestnut at Burleigh.

We have already described in this Journal the present state of three out of the four trees in this county which were mentioned and drawn in the *Silva Britannica*, published by J. G. Strutt in 1822. The remaining tree is the subject of our present illustration.

Mr. Strutt describes it as "the extraordinary specimen of this tree which stands in the Court yard of Burleigh House," and proceeds to give measurements of it as follows:—"The height," he says, "of this fine tree is sixty feet; its circumference, at four feet from the ground, is 10 feet; it contains 300 feet of solid timber, and its branches extend over an area of 61 feet in diameter."

Recent measurements give a height of 78 feet, taken as in former cases to the topmost twig, a girth at four feet from the ground of 12 feet 6 inches, and a horizontal spread of 84 feet at its largest diameter.

These measurements shew an increase in girth in the sixty years which have elapsed since Mr. Strutt's book was published of 2 feet 6 inches, or an average increase of half-an-inch per annum.

The tree can hardly now be called extraordinary, being considerably smaller in girth than the Horse Chestnuts already described at Milton Park (p. 131 in this volume). It is also smaller than the tree known as the "Great Chestnut" at Castle Ashby. An earlier measurement of this latter tree is available, which will be interesting for comparison. It measured 13 feet 4 inches in girth at four feet from the ground in 1833, and now measures 15 feet 6 inches, shewing an increase in fifty years of 26 inches, a rate of progress almost exactly equal to that of the Horse Chestnut at Burleigh.

There is a tradition at Burleigh that the Chestnut was planted by the first Earl, the son of the Lord High Treasurer, but it is hardly likely to be so old. It was probably planted, like the Chestnut at Castle Ashby, in the early part of the eighteenth century.

The photograph was taken in November, 1883.

## ORNITHOLOGICAL NOTES.

### The Little Auk.

Our readers, especially those interested in Ornithology, will be delighted to hear that a fine specimen of the Little Auk or Rotche ("Alea Alle") has been taken alive in our county. It was driven inland by the recent storm, and on Wednesday night,* at about 9 o'clock, was heard pecking and beating its wings at the door of Mr. Facer, of Thornby, not far from the Naseby reservoir, where so many of our winter rare ones are met with. The bird is in the possession of Mr. W. Bazeley, Bird-stuffer, of this town, and is at this present time as lively and pugnacious as other individuals of the species are said to have been when caught alive. Morris records that "one was found dead upon the ice in the Lordship of Great Houghton, in 1854." He also tells us "one was caught alive at Wildon," but does not say when. This species, in almost incredible numbers, haunts the Polar regions, but it is entirely a sea-bird, and only to be met with so far inland as this, when driven by a severe storm such as that to which we owe this unwilling, but by no means unwelcome, visitor.

GEO. NICHOLSON.

* December 12.

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October 20th.—A fine adult male Rough-Legged Buzzard, Buteo Lagopus (Gmelin) was shot at Strixton.

H. TOMALIN,
Northampton.

December, 1883.

## ERRATA.

### NOTES ON BIRDS OF NORTHAMPTONSHIRE.

| Vol. | Page. | Line. | Error. | Correction. |
|---|---|---|---|---|
| I. | 5 | 16 | Goldon | Golden |
| I. | 6 | 5 | Article 3, Osprey—Fencand | Fenland |
| I. | 7 | 7 | ,, westerley | westerly |
| I. | 7 | 8 | ,, probable | probably |
| I. | 7 | 10 | Article 4, Peregrine Falcon—prrt | part |
| I. | 7 | 14 | ,, ,, almst | almost |
| I. | 9 | 27 | Article 5, Hobby—Tubervile | Turbervile |
| I. | 31 | 40 | Article 8, Sparrow Hawk—after female | insert comma |
| I. | 77 | 11 | Article 18, Scops Owl—after found .., | insert that |
| I. | 117 | 14 | clergymen | clergyman |
| I. | 139 | 36 | Turbus antrigularis | Turdus atrigularis |
| I. | 207 | 23 | Article, Hedge Sparrow—marked | remarked |
| I. | 264 | 31 | turf | tuft |
| I. | 264 | 42 | marches | marshes |
| II. | 183 | 30 | henceforward | thenceforward |
| II. | 216 | 25 | no | an |
| II. | 221 | 23 | in | during |
| II. | 263 | 33 | July | November |

### MEETINGS.

| | | | | |
|---|---|---|---|---|
| | 127 | 26 | Doronicum Pardaliauches | Doronicum Pardalianches |
| | 173 | 5 | omit "the" before parasites | |
| | 173 | 5 | Feliaceus | Foliaceus |

### LOCAL GEOLOGY.

| | | | | |
|---|---|---|---|---|
| | 241 | 37 | A communis | A annulatus. |
| | 243 | 9 | After Yorkshire insert "A. annulatus. | |

### LEPIDOPTERA.

| | | | |
|---|---|---|---|
| II. | 330 | Second line from bottom—majn | major. |
| II. | 334 | First line of Notes—causes | cause. |
| II. | 248 | Ninth line from top—Family IV. | Family XIV. |

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NOTE.—Where no Town is mentioned Northampton is to be understood.

The above List is corrected to September, 1883.

## LAWS.

1. NAME.—That the Society shall be named "The Northamptonshire Natural History Society and Field Club."

2. OBJECTS OF THE SOCIETY.—The objects of the Society are to encourage a taste for Natural History, and to facilitate its study by meetings for the reading of papers, the exhibition of specimens, the formation of a library and museum, and the record of the Natural History facts of Northamptonshire.

3. CONSTITUTION.—The Society shall consist of Honorary, corresponding, life, and ordinary members.

4. HONORARY AND CORRESPONDING MEMBERS. — Individuals distinguished for their researches in Natural Science, for their liberality to this Society, or for other reasons, may, on the recommendation of the Committee, be elected honorary or corresponding members at any general meeting.

5. LIFE MEMBERS.—Any person may become a life member on the payment of Five Guineas, or of books or apparatus of that value. All amounts thus obtained to be set aside for a special fund.

6. ELECTION OF MEMBERS.—New members may be nominated in writing, by a proposer and seconder, at any meeting of the Society, and the names shall be read from the Chair—their election shall take place at the next meeting by show of hands, or, if demanded, by ballot.

7. PRIVILEGES AND DUTIES OF MEMBERS.—Every member shall be admitted to all meetings of the Society, and have the use of all books, specimens, and instruments, subject to such conditions as the Committee may determine. He may also introduce two friends to the Society's meetings who shall not, however, take part in the proceedings, except by permission of the Chairman.

8. SUBSCRIPTION.—The annual subscription shall be Ten Shillings, due the first day of January in each year, until resignation, or declaration of forfeiture of membership; but the members of the Science Classes may become annual members on payment of 2/6 per annum so long as they continue to be members of the Science Classes; but they shall not be entitled to the Journal. The Committee shall have power to declare that any member, whose subscription is twelve months in arrear, shall cease to be a member of the Society.

9. MEETINGS AND ORDER OF BUSINESS—

1. The meetings shall be of two kinds—ordinary and sectional—and there shall be field days in May, June, July, and August if possible.

2. General meetings shall be held on Thursdays, at least once in October, November, December, January, February, and March; and sectional meetings shall be held on alternate Tuesday evenings throughout the year. The meetings shall be open to all members of the Society. A printed notice of papers to be read at the general meetings shall be sent to every member.

3. The course of business at all general and sectional meetings shall be:

1. Confirmation of minutes of previous meeting.
2. Ballot for members previously proposed.
3. Proposal of new members.
4. Miscellaneous business.
5. Reading of papers.
6. Exhibition of specimens.

10. FORMATION OF SECTIONS.—Each section shall consist of not less than six members, who shall elect their own officers. A section may be formed upon the written requisition of not less that six members, addressed to the Committee, who shall decide whether it be in the interest of the Society that such Section be formed.

11. OFFICERS.—The officers of the Society shall consist of a President, four Vice-Presidents, one or more Secretaries, a Treasurer, and the Presidents and Secretaries of Sections.

12. DUTIES OF PRESIDENT AND VICE-PRESIDENTS.—The President shall be in virtue of his office the Chairman of the general meetings of the Society and of the Committee. The senior Vice-President present shall take the Chair in the absence of the President.

13. DUTIES OF SECRETARIES.—The Secretaries shall record in the Transaction Book the transactions of the Society at all its meetings, and in the Minute Book the transactions of the Committee, shall conduct the business of the Society, and prepare an annual report.

14. DUTIES OF TREASURER.—The Treasurer shall receive all sums due to the Society, and make all payments authorised by the Committee. He shall keep an account of all his receipts and payments in the Society's Cash Book, which account shall be balanced annually, examined by two auditors, and presented at the annual meeting. The Treasurer shall also keep a register of the names and addresses of all the members of the Society.

15. DUTIES OF LIBRARY COMMITTEE.—They shall have charge of the library and specimens belonging to the Society, in accordance with such bye-laws as the Committee may determine, and shall report at the annual meeting as to the state of the property under their care.

16. COMMITTEE.—The management of the affairs of the Society and the administration of its funds shall be vested in a Committee, consisting of seven members of the Society and of the officers, who shall be *ex-officio* members of the Committee. The election shall be conducted as follows :—

Any member may nominate a member to serve on the committee, in writing, to the Secretaries at least one week before the annual meeting; and a list of these members, and the members of the retiring Committee, who are eligible for re-election, shall be printed and a copy given to every member at the annual meeting, who shall mark the names of the seven members for whom he votes. All members of the Committee shall retire from office every year, and those members only shall be eligible for re-election who have attended at least four Committee meetings during their year of office.

The Committee shall meet on the first Tuesday in every month, or at such other times as may be necessary. Five members shall form a quorum.

They shall purchase such books, specimens, &c., as they may think desirable, examine all accounts and authorise their payment, and conduct the general business of the Society.

The Committee shall have power to fill up any vacancy occurring in their body or in the list of officers.

17. AUDITORS.—At the meeting next preceding the annual general meeting two members, not on the Committee, shall be appointed, who shall audit the Treasurer's Accounts.

18. ANNUAL MEETING.—The annual meeting shall be held in February, when the report of the proceedings of the past year shall be read, the Treasurer's audited accounts be submitted, the Committee and Officers for the ensuing year be elected, and other business relating to the interests of the Society be transacted.

19. MODE OF VOTING.—All votes shall be taken by show of hands, or, if demanded, by ballot, except in cases otherwise specially provided for in these laws.

20. ALTERATION OF LAWS.—No alteration of these laws shall be made except at the annual meeting of the Society; and any proposed alteration must be read from the Chair at the next previous ordinary meeting, and the particulars of such alteration shall be inserted in the notice calling the annual meeting.

## LIBRARY BYE-LAWS.

I.—That any member detaining any Book, etc., for a longer period than one month (28 days), be fined One Penny per week until returned.

II.—That any member returning a Book may take it out again if no other member has made an application for it.

III.—That every member shall be responsible for any Book lent to him, and, if lost or damaged, shall make reparation.

IV.—That the Library shall be closed for the fortnight previous to the annual meeting, and that any member keeping a book after the day appointed for the closing the Library, be fined One Shilling.

V.—That no member shall retain any Periodical for a longer period than one week, until two months after the date of publication.

VI.—That certain Books of Reference, to be named by the Committee, shall not be taken away until the close of any meeting, and must be returned ere the opening of the next meeting. Any member infringing this Rule to be fined Threepence each time.

VII.—No Books, Periodicals, etc., may be taken from the Library except under the supervision of the Library Committee, and any member wishing to borrow a Book, etc., must signify his wish to one of the Library Committee at any meeting of the Society, who shall enter the name of the member, particulars of the Book, etc., and date of such loan, in a book kept for the purpose.

## —CATALOGUE OF BOOKS.—

*(Corrected to September, 1883.)*

*Album of Photographic Views.
Braithwaite, R. British Moss Flora. 7 parts.
Caird, J. English Agriculture in 1850 and 1851. 1852.
Chapuis and Delwaque. Atlas of plates.
Damon, R. Handbook to the Geology of Weymouth. 1860.
,, Supplement to the Handbook to the Geology of Weymouth. 1864.
Davy, Humphry. Elements of Agricultural Chemistry. 1839.
*Dresser, H. E. History of the Birds of Europe. 9 vols. 1871-1881.
Francis, G. W. An Analysis of British Ferns and their Allies. 1842.
*Gould, John. Birds of Great Britain. 5 vols. 1862-1873.
Gray R. Birds of the West of Scotland. 1871.
Griffith & Henfrey. Micrographic Dictionary. 2 vols. 1875.
Holiday Rambles of a Naturalist.
Hooker's British Ferns.
Hughes, W. R. Principles and Management of Marine Aquarium.
Ibis, The. A Magazine of General Ornithology. 20 vols. 1859, etc.
James T. The History and Antiquities of Northamptonshire. 1864.
Jeffreys. British Conchology. 1862.
Johnston, J. F. W. Notes on North America. 2 vols. 1851.
,, ,, On Uses of Lime in Agriculture. 1849.
,, ,, Chemistry of Common Life. 2 vols. 1856.
,, ,, Lectures on Agricultural Chemistry. 1844.
†Jukes, J. Beete. Students Manual of Geology. 3rd ed. 1872.
Kirby and Spence. Entomology 1856.
Knipe. Geological Map of England. 1880.
Liebig's Organic Chemistry of Physiology and Pathology. 1st ed. 1842.
,, Organic Chemistry of Physiology and Pathology. 2nd ed. 1842.
,, Chemistry, in its application to Agriculture and Physiology. 1847.
,, Principles of Agricultural Chemistry. 1855.
†Lowe, E. J. Our Native Ferns. 1865.
Lubbock, J. Various Papers, etc., bound in 1 vol.
Lycett, J. The Cotteswold Hills. 1857.
Lyell Chas. Elements of Geology. 6th ed. 1865.
†Mivart, St. Geo. The Common Frog. 1874.
† ,, Lessons from Nature.

†Molloy, G. Geology and Revelation. 1872.
*Morton, John. The Natural History of Northamptonshire. 1712.
The Naturalists' Miscellany or coloured figures of natural objects. 14 vols.
Northamptonshire Natural History, Journal of the. Vol. 1. 1880-81.
Nesbit, J. C. On Agricultural Chemistry. 1856.
Ormerod, E. A. Manual of Injurious Insects. 1881.
Ralph. Icones Carpologicæ. 1849.
Reeve. British Land and Fresh Water Mollusks. 1863.
Reynold. Geological Atlas of Great Britain.
Sharp, S. Rudiments of Geology. 1st and 2nd editions. 2 vols. 1875-76.
,, Sketch of the Geology of Northamptonshire. Tract. 1874.
Simond's Rot in Sheep. 1880.
Slack, H. J. Marvels of Pond Life. 1861.
*Sowerby's English Botany. 6 vols.
Taylor, J. Geological Essays. 1864.
Thompson, T. On Heat. 1840.
Tull, J. The Horse-Hoeing Husbandry. 1733.
Warner, R. Plantæ Woodfordensis. 1771.
Watson, H. C. Geography of British Plants. 1835.
Whewell, W. Astronomy and Physics considered with reference to Natural Theology (Bridgewater Treatise). 1837.
Woodward, S. P. A Rudimentary Treatise of recent and Fossil Shells. 1844.

*PALÆONTOGRAPHICAL SOCIETY'S PUBLICATIONS.

Adam, A. L. Fossil Elephants. 1877, etc.
Bell, J. Fossil Malacostracous Crustacea. 1857.
Bonney, E. W. Structure of Fossil Plants found in Carboniferous Strata. 1868, etc.
Brady, G. S., Crosskey, H. W., and Robertson, D. Post-tertiary Entomostraca of Scotland, etc. 1874.
Brady, H. B. Carboniferous and Permian Foraminifera. 1876.
Bush, G. Fossil Polyzoa of the Crag. 1859.
Darwin, Chas. Fossil Lepadidæ. 1851.
,, Fossil Balanidæ and Verrucidæ. 1854.
Davidson, T. Fossil Brachiopoda. 1851, etc.
Dawkin, W. B., and Sanford, W. A. Pleistocene Mammalia. 1866, etc.
Duncan, P. M. Fossil Corals. Second series. 1866-72.
Edwards, F. E. Eocene Mollusca. 1849-58.
Edwards, H. Milne, and Haime, J. Fossil Corals. 1850-55.
Forbes, E. Echinodermata of the British Tertiaries. 1852.
Gardner, J. S., and Ettinghausen, C. V. Eocene Flora. 1879, etc.

Jones, T. R. Entomostraca of the Cretaceous Formation of England. 1849.
,, Tertiary Entomostraca of England. 1857.
,, Fossil Estheriæ. 1862.
,, Kirkby, J. W., and Brady, G. S. Fossil bivalved Entomostraca from the Carboniferous strata. 1874, etc.
,, Parker, W. K., and Brady, H. B. Foraminifera of the Crag. 1866, etc.

King, G. Permian Fossils of England. 1850.

Lycett, J. Fossil Trigoniæ. 1872-79.
,, Mollusca from the Stonesfield Slate, Great Oolite, Forest Marble, and Cornbrash. Supplement to Fossils from the Great Oolite. 1863.

Miall, L. C. Sirenoid and Crossopterygian Ganoids. 1878, etc.

Morris, J., and Lycett, J. Mollusca from the Great Oolite. 1850-55.

Owen, R. Fossil Reptilia of the Cretaceous Formations. 1851-64.
,, Fossil Reptilia of the Wealden and Purbeck Formations. 1853-64.
,, Supplements, etc. 1871, etc.
,, Fossil Reptilia from the Kimmeridge Clay. 1860, etc.
,, Fossil Reptilia of the Liassic Formations. 1861, etc.
,, Fossil Cetacea from the Red Crag. 1870, etc.
,, Fossil Mammalia of the Mesozoic Formations. 1871.
,, Fossil Reptilia of the Mesozoic Formations. 1874, etc.
,, and Bell, T. Fossil Reptilia of the London Clay. 1849-58.

Phillips, J. Belemnitidæ. 1865.

Powrie, J., and Lankester, E. R. Fishes of the Old Red Sandstone. 1868, etc.

Salter, J. W. Trilobites. 1864.

Sharpe, D. Fossil Remains of Mollusca found in the Chalk of England. 1853.

Traquair, R. H. Ganoid Fishes of the British Carboniferous Formations. 1877.

Wood, S. V. Crag Mollusca, etc. 1848-74.
,, Eocene Bivalves of England. 1861, etc.

Woodward, H. Fossil Crustacea belonging to the Order Merostomata. 1866-78.

Wright, T. Fossil Echinodermata from the Oolitic Formations. 1856-80
,, Fossil Echinodermata from the Cretaceous Formations. 1864-82.
,, Lias Ammonites. 1878, etc.

JOURNALS, TRANSACTIONS, AND REPORTS RECEIVED FROM NATURAL HISTORY SOCIETIES.

Bound Vol. of Natural History Society Reports — Croydon, 1873-78; Geology of Croydon; North Staffordshire, 1877; Bedfordshire, 1875-77; Leeds, 1875-77; Nottinghamshire Naturalists' Society, 1877.

North Staffordshire Natural History Society. 1 vol. 1870-75.
Essex Field Club. Vols. 1 and 2. 1880-82.

Also, the following which are not yet bound :—

Bedfordshire Natural History and Field Club. (1 No.) 1877-81.
Birmingham Natural History and Microscopical Society. (4 Nos.) 1869 and 1880-82.
Burton-on-Trent Natural History and Archæological Society. (2 Nos.) 1879-80.
Chester Society of Natural Science. Proceedings. (1 No.) 1879.
" " " Reports. (4 Nos.) 1879-83.
Croydon Microscopical Club. (3 Nos.) 1872. Also, 1878-82.
Essex Field Club. (1 No.) 1883.
Manchester Scientific Students' Association. (1 No.) 1878.
Norfolk and Norwich Naturalists' Society. (14 Nos.) 1869 to 1882.
North Staffordshire Naturalists' Field Club and Archæological Society. (2 Nos.) 1881-82.
Nottingham Literary and Philosophical Society. (2 Nos.) 1879-81.
Nottingham Naturalists' Society. (1 No.) 1881.
Peterborough Natural History Society. (1 No.) 1881-82.
Rugby School Natural History Society. (5 Nos.) 1878-82.
South London Microscopical and Natural History Club. (2 Nos.) Map of District. 1883.
Yorkshire Naturalists' Union Transactions. Parts 1 to 6.

## MAGAZINES AND JOURNALS.

Bound Vols :—

British Association Reports. 1835-42-43-and-45.
Entomologist. 3 vols. 1878, 1879, and 1881-82.
Geological Magazine. 6 vols. 1866-70 and 1876.
Geologist. 1 vol. 1862.
Journal of Society of Arts. 1 vol. 1860.
Journal of Botany. 1876-77-78.
Meteorological Magazine—Symond's. 1 vol. 1880-82.
Midland Naturalist. Vol. 1. 1878.
Microscopical Journal. 2 vols.
Nature. Vols. 18, 19, 20.
Popular Science Review. Vols. 11, 13, 14, 15, 17.
Zoologist. Vol. 1. 1877.

Unbound Vols. :—

Entomologist. Monthly.

Geological Magazine. Monthly.
Midland Naturalist. ,,
Nature. Weekly.
British Association Reports.

PAMPHLETS.

History of Rothwell. P. Cypher. 1869.
Local Land and Fresh Water Shells. Dodd & Mussom, Nottingham, 1881.
London Catalogue of British Plants. 1871, 1883.
,, ,, ,, Mosses. 1877.
Meteorology of Croydon. G. Corden. 1878.
Notes on the Flora of Northamptonshire. Druce.
On Shepheardella. Liddall. 1880.
On the Quartizite Pebbles in the Drift. W. J. Harrison. 1882.
Parrots of Victoria. T. A. Forbes, Leith. 1883.

* Books marked with an asterisk are works of Reference only, and are not allowed to be taken from the Library.

† Lent by the Rev. Canon Scott.

# REPORT

*For the year 1882, read by S. J. Newman, Hon. Sec., and adopted at the Annual Meeting held in the Council Chamber, Guildhall, February 27th, 1883.*

OUR Society has now been in existence nearly seven years, for it was in March, 1876, that Mr. Jecks called together a meeting of gentlemen interested in Natural History and formed a committee to start the Society, which has now grown from 88 members the first year to a list more than double that number. We are steadily increasing—and in view of the growing interest taken in scientific pursuits, there is every prospect of our continuing to increase. True we do not keep all who join, as the novelty wears off we must expect to lose some few; but decay need not be feared whilst we have a strong nucleus of workers following up one or other of the branches of Natural History which the Society desires to encourage.

MEETINGS.—This year—for the first time—the various sections have held regular meetings throughout the year, three sections being taken every alternate Tuesday (with the exception of the photographical). These fortnightly meetings appear to be succeeding as a means of bringing together those who are interested in the different sections, and it is therefore proposed to continue them. We must, however, urge upon the officers to shew their interest, either by contributing papers, by personal attendance, or by making proper arrangements for their own section to be represented in some way each month. During the past year (1882) we have had 14 papers read at our meetings, amongst them being—"Glaciers," by the Rev. S. J. W. Sanders; "Northamptonshire as a Botanical District," by the Rev. M. J. Berkeley; Mr. Tomalin on "The Hornet Clearwings;" Mr. R. Rogers on "The St. John's Worts or Hypericums;" and various others. Also at the soiree—"Museums and our Museum," by the Rev. S. J. W. Sanders; "The Locomotive Power of Birds," by the Rev. G. Nicholson; and "Comets," by Mr. Beeby Thompson.

Our Society was represented at the fifth annual meeting of the Midland Union of Natural History Societies, held at Nottingham in June; only three of our members attended. The benefits to our Society from connection with the Union is not very evident. It has now been in existence six years, and no concerted scheme of work for the societies connected with

it has been arranged or started, other than such as societies might individually carry out without the aid of the Union. An opportunity for one or two of our members to meet other societies once a year has hitherto been the chief advantage. Would it not be better to cultivate concerted action amongst *all* the Natural History Societies throughout the country, by means of the annual British Association meeting? In connection with this there is now held every year a conference of delegates from scientific societies.

SOIREE.—The members' soiree (held at the Grammar School at the beginning of the winter session) proved very successful, and was largely attended—our thanks are due to the gentlemen who, by their numerous contributions and assistance, added so much to its success. We hope to make this an annual event, and we should like to see successive soirees devoted to special ends. Thus we might hold it this year rather earlier in the autumn, and so enable us to make the chief feature an exhibition of the various species of fungus to be found in our neighbourhood; and, if well worked, there should be no difficulty in making this alone a sufficiently attractive show. Lichens and perhaps galls might also be added. Reference was made in last year's report to the Gilchrist Lectures given that winter. A good attendance was maintained at the two lectures since that report, but the difference in the audience at the earlier and later lectures was very marked, the number of the working classes attending them having much diminished in the last lectures. We regret that the lectures resulted in a small deficit (though pecuniary profit was not the object). The amount taken was £29 5s. 5d., but the expenses unfortunately amounted to £29 12s. 0d., hence there was a deficit of 6/7. We hope to obtain these lectures again during next winter, and by avoiding some of the expenses incurred last time, the result may perhaps be more satisfactory financially.*

MS. RECORD.—It will be remembered that in the monthly notices for August and September (1882), we broached the idea of a MS. record of observations, hoping that our country members would send us in notes of occurrences worth recording, which would be read at our sectional meetings and the sheets afterwards filed for reference. This request has been responded to by some members, but we trust that more will assist in this way during the coming year.

EXCURSIONS.—We have not done much in excursions during the year, though in July we had a very pleasant excursion to Fawsley, Catesby, Daventry, and the neighbourhood, which was well attended. The photo-

* I am pleased to add that the Gilchrist Lectures are promised us for the coming winter. S. J. M.

graphical section also had a pleasant day out at Weekley, Warkton, and Boughton House. In May, June, July, and August eight evening walks and excursions to short distances were arranged, but these were not well attended.

JOURNAL.—Our Journal continues to appear with regularity every quarter. Lord Lilford's attractive "Notes on Birds," which go far to place it on a par with the Journal of any other Society, Mr. G. C. Druce's "Flora of Northamptonshire," and Mr. Beeby Thompson's "Notes on the Geology of the District," are still in progress. Messrs. W. Hull and H. F. Tomalin have also commenced a list of Lepidoptera observed in the vicinity. By the end of the year sixteen notable trees in the county will have been illustrated, and the editors propose then to take some other subject for photographic illustration. These photographs have already proved their value as a record, for three of the trees have since met with mishaps—Queen Elizabeth's Lime Tree, at Burghley, was ruined by the gale of October, 1881; the Fawsley Willow had the top blown off last February; and the Lowick oak had a narrow escape from destruction, a fire having burnt a large hole in the trunk.†

LIBRARY.—The library has been fairly used during the year. Members have a better opportunity of changing books now meetings are held every fortnight, as we are in attendance those evenings from 8 to 10. We may repeat the note added at the foot of the last library list. Lord Lilford has enriched our library by gifts of very valuable books. May we hope that others will also assist us by donations of books relating to any of the various branches of Natural History. Having already such a good nucleus, we wish to see it grow to a library equalling if not excelling such fine libraries as those possessed by the Natural History Societies of Chester, Essex, Nottingham, and many others.‡ But probably no provincial Society possesses such a treasure as we have in Gould's Birds of Britain, and in Dresser's eight fine vols. of Birds of Europe (which we have this year received back from the binders)—we cannot be too grateful to our noble President for these evidences of his continued interest in our welfare. We exchange publications with nine or ten Societies. Our thanks are especially due to the Norfolk and Norwich Society, who have just sent us a complete set of their publications. We have also to report the receipt of several vols.

† We learn from Lord Lilford that another tree illustrated—the Walnut at Pilton—has also suffered damage since it was photographed.

‡ The Chester Society has a remarkably fine library for a country society. 170 books in the Botanical section; 130 Geological, including a complete set of the Palæontographical; and 220 Zoological and other books.

of the British Association transactions, and the Rev. J. J. R. Knipe has presented us with a copy of Knipe's "Geological Map of England."

*Since this report was read we have obtained another valuable acquisition to our library by the purchase of a complete set of the Palæontographical Society's Publications.*

FINANCE.—We regret that Mr. Bailey having been seriously ill has felt compelled to resign his post of treasurer to our Society, and we shall ask you to express your thanks to him for his past services, having fulfilled the duties of treasurer from the commencement of the Society in 1876. You will be asked to elect a treasurer in his place. Mr. Hesleden has been proposed and this will probably meet with your approval.

(Mr. Hesleden was subsequently elected Hon. Treasurer.)

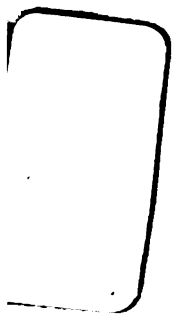
Owing to Mr. Bailey's illness, it was not possible to present the balance sheet at the annual meeting, but the accounts have since been audited, and the balance sheet is presented herewith, showing a balance carried to 1883 of £1 16s. 10d. We have had, in 1882, extraordinary expenditures, as binding Dresser's "Birds of Europe," £9 16s. 6d.; reprinting an early number of the Journal to supply demand for back numbers, £4 12s. 6d.; and also arrears, £6 13s. 5d., due for various small items which had been allowed to accrue since 1879, and are now cleared off.

S. J. N.

# ABSTRACT OF RECEIPTS AND EXPENDITURE FOR THE YEAR ENDING 31st DEC., 1882.

| Dr. Receipts. | £ s. d. | £ s. d. |
|---|---|---|
| By Balance in hand January 1st, 1882 ... ... | | 3 12 2 |
| ,, Subscriptions received :— | | |
| 161 at 10/- ... ... ... | 80 10 0 | |
| 10 at 5/- ... ... ... | 2 10 0 | |
| 1 Life Subscription (from special fund a/c.) ... ... ... | 5 5 0 | |
| | | 88 5 0 |
| ,, Sale of Journals... ... ... ... ... | | 11 5 0 |
| ,, Tickets and admissions to Soiree ... ... | | 1 3 6 |
| | | £104 5 8 |

| Cr. Payments. | £ s. d. | £ s. d. |
|---|---|---|
| To Journals Account :— | | |
| Photographs—Woodbury Co.. | 14 2 0 | |
| Printing—Stanton ... ... | 3 18 6 | |
| Ditto—Cordeux & Sons ... | 32 13 6 | |
| Ditto—Lithographs, &c., Law | 2 19 6 | |
| Ditto—Midland Union Report —Wright, Dain, & Co. ... | 1 1 0 | |
| | | 54 14 6 |
| To Secretarial Expenses—Stationery, Postages, Meteorological Forms, &c. ... ... .. | | 7 1 10 |
| ,, Subscription to Midland Union ... ... | | 2 0 0 |
| ,, Ditto to Palæontographical Society ... ... | | 1 1 0 |
| ,, Magazines — Geologist, Entomologist, Nature, &c. ... ... ... ... .. | | 4 18 5 |
| ,, Midland Naturalist ... ... ... ... | | 0 12 0 |
| ,, General Printing—Members' Cards, Monthly Notices, List of Members, Bye-Laws, &c., Circulars issued to county, and Arrears ... | | 14 2 9 |
| ,, Binding, lettering, and indexing Dresser's "Birds of Europe"—Porter ... ... | | 9 16 6 |
| ,, Binding eight Journals... ... ... .. | | 1 4 0 |
| ,, Putting glass in cupboards ... ... ... | | 1 1 8 |
| ,, Gas ... ... ... ... ... ... | | 0 11 0 |
| ,, Donation to Museum attendant ... ... | | 1 0 0 |
| ,, Loss on Gilchrist Lectures ... ... ... | | 0 6 7 |
| ,, Expenses of Soiree, November ... ... | | 3 18 7 |
| Balance in hand ... ... .. ... | | 1 16 10 |
| | | £104 5 8 |

Examined and found correct,

THOMAS J. GEORGE,
ED. R. BETTS, } Auditors.